Bakery Show Report

NOVEMBER 1955
35 CENTS

FOOD ENGINEERING

A McGRAW-HILL PUBLICATION

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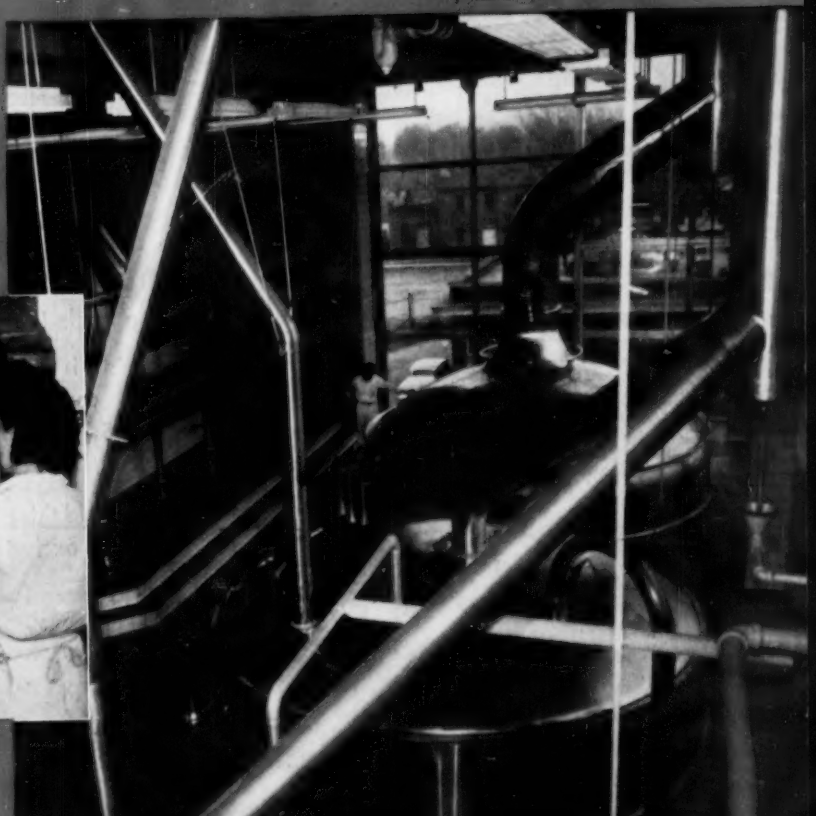

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INSTRUMENTS • TRANSPORTATION • QUALITY CONTROL
INGREDIENTS • PRODUCTS

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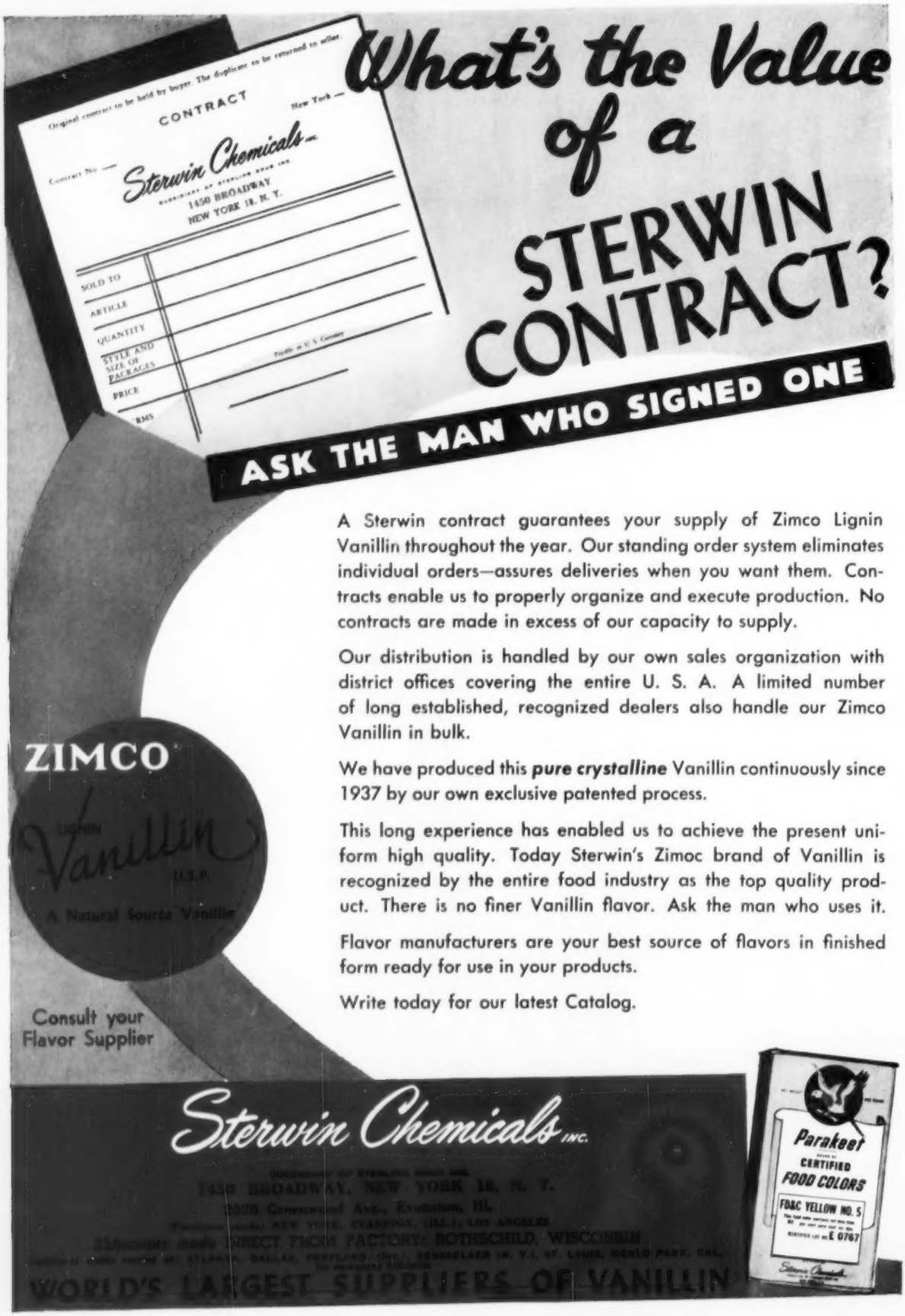
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NOVEMBER 1955

Volume 27 Number 11

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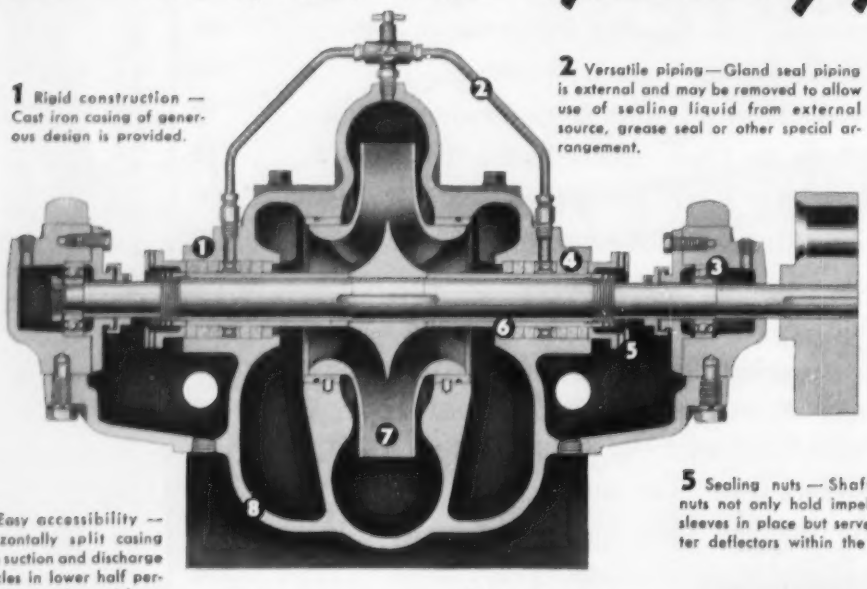

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3 Ball bearings—Grease lubricated, single-row bearings are held in proper alignment in a heavy one-piece housing.

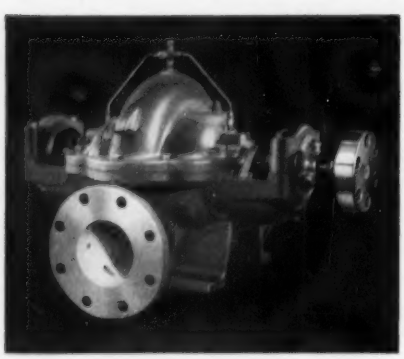
4 Generous stuffing boxes — Boxes are deep to carry ample backing, yet are easily accessible for maintenance.

5 Sealing nuts — Shaft sleeve nuts not only hold impeller and sleeves in place but serve as water deflectors within the glands.

6 Long wearing sleeves — Standard shaft sleeves are of accurately machined bronze. Sleeves extend through stuffing box, right up to impeller hub.

7 Vibrationless operation — Bronze impeller is carefully balanced, double-suction type.

8 Easy accessibility — Horizontally split casing with suction and discharge nozzles in lower half permits inspection without disturbing piping.



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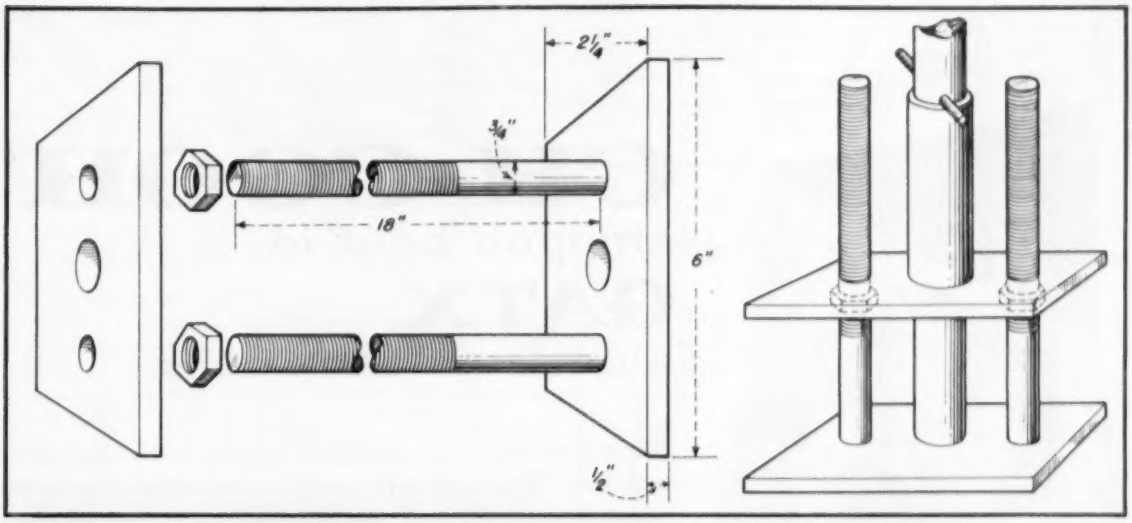
PRACTICAL IDEAS



Way to Pull Broken Shaft

At our plant a 12-ft. long ¾-in. shaft broke inside a large heavy piece of equipment. Before repairs could be made it was necessary to pull the shaft. After other means failed this method described below proved successful.

From a section of ½-in. sheet iron (see left in sketch) a piece was cut 6 in. by 2¼ in. To this sheet two bolts ¾ in. x 18 in. were welded, threaded 12 in. from the outer end. These were mounted on either side of a hole cut in the plate large enough in diameter to slip over the end of the broken shaft.

Three holes were then drilled in another sheet of iron cut to the same size as the first. These were drilled to such size and so located as to fit over the two bolts and also to line up the holes for the shaft.

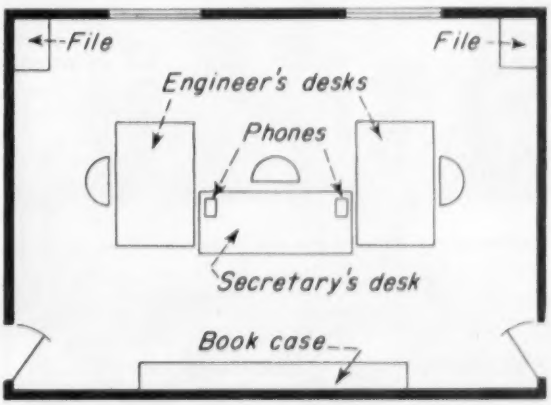
To remove the shaft, the iron collar to which the bolts were welded was placed over the shaft. Then the holes in the second sheet were placed over the bolts and also the shaft. The end of the broken shaft was threaded. Thus, by adding washer and bolts to the shaft, a shoulder was provided for pulling it.

In the event there are no threads on the end of a shaft and that threading would prove impractical, merely drill a hole through the shaft to take a pin in order to provide a pulling shoulder.

Now when the nuts underneath the second plate are screwed out to the end of the bolts the shaft will be pulled out between 10 and 12 in.

Here is the means we used to extend the pulling effect until the shaft was clear of the equipment.

A number of lengths of 1 in. pipe (right in sketch) were cut to fit over the end of the shaft. Now following each pull of the shaft the nuts under the second plate are threaded out as far as possible and one of the 10-in. sleeves slipped over the shaft. Then the shoulder nut and washer or the shoulder pin replaced. This procedure is repeated until the shaft is loose enough to be removed by hand.—*F. B. Johnson, Superior, Neb.*



Handy Office Arrangement

Layout of office units for single executives and their secretaries is generally a conventional matter posing few, if any, problems.

But when differing number of executives and secretaries, or other assistants, are to be accommodated, special attention to arrangement of desks, files, and phones can go far in streamlining the office performance.

Example is the convenient arrangement above for opti-

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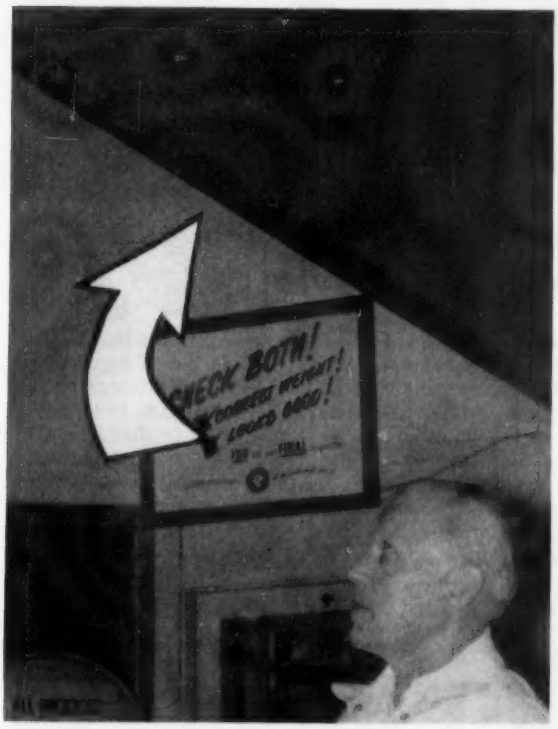
mum efficiency of two engineers and one secretary. Note handiness of individual files for each engineer, ready central location of book case, and positioning of the phones before the secretary for service to either man.—*FE Staff*

V-Belt Hints

It's good practice to keep V-belts on hand at all times to take care of any replacement problems which may suddenly arise. If one belt should fail in a multiple drive the entire drive should be provided with a new matched set.

Simply putting on one new belt is not enough. A belt which hasn't been worn is shorter than the worn ones and thus would have to pull most of the load. This would cut down on drive efficiency and greatly shorten the new belt's life.

Belt replacement costs are usually small, even for a full set. But thousands of dollars may be lost if a machine stops, halting production and idling many workers while a replacement belt is installed or ordered and delivered. If extra belts are kept on hand most of this waste time will be avoided.—*Dayton Rubber Co., Dayton, Ohio.*



Refrigeration Losses Curbed

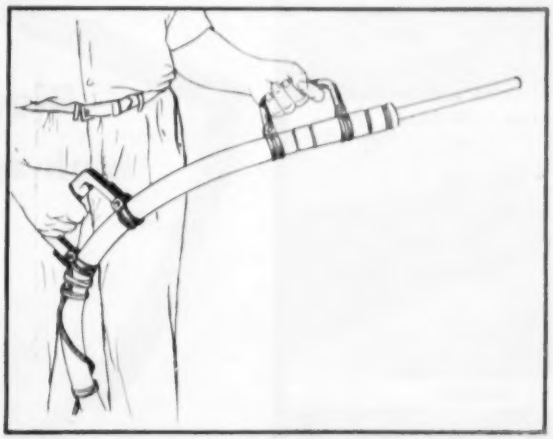
By simply suspending a Fiberglas curtain (see arrow in photo) from ceiling between loading dock and market department adjacent to our main storage cooler, we've been able to save a considerable amount of refrigeration during the past year.

In fact, the first year's savings in refrigeration have more than paid for installation of the curtain. And we're so pleased with the results that additional curtains are now going up in other plant areas to cut down on refrigeration losses.

Cost of the curtain plus 3 man-day installation cost was about $175.

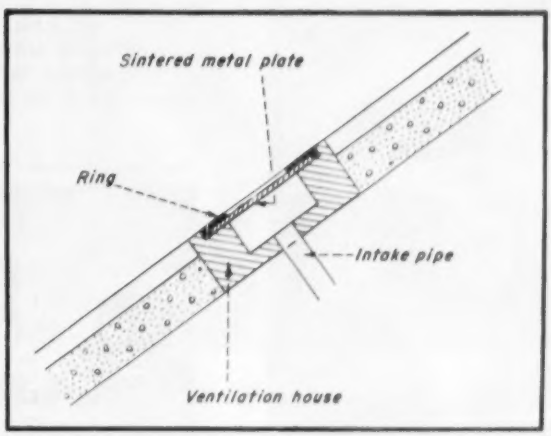
Curtain comprises ⅛-in. Fiberglas sheets (2x6 ft.) bolted together and sealed with strips of Fiberglas. Sheets are bolted to 1¼-in. x 1¼-in. x 12 ft. dural angle (L-shaped, aluminum-alloy bar) at the ceiling and a similar reinforcing bar about 6 ft. from the ceiling.

This permanent, easy-to-clean curtain requires no maintenance. And it saves refrigeration by trapping warm outside air that rises to the ceiling, and keeping it out of the market department area.—*Carl Erickson, Plant Engineer, and Wm. Topps, Supervisor of Market & Shipping, Reliable Packing Co., Chicago.*



Steam Hose Control Handle

A device can readily be applied to permit improved control and safer operation of a clean-up, wash-down steam hose. The rear handle (see sketch) is made of aluminum and is equipped with a trigger connected to a six-volt relay box. This relay activates an air solenoid valve which in turn operates a diaphragm, allowing steam to pass through a control valve to the hose. Front handle is used to direct the steam. For prolonged use, leather gloves are recommended.—*National Safety Council, Chicago (DuPont Corporation contributed).*

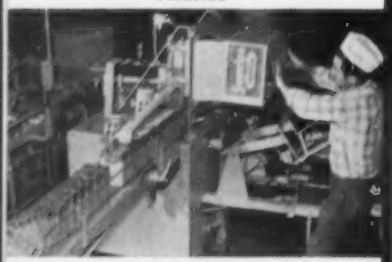


Maintains Flow of Drys in Hopper

A plant "kink" of use to any industry using pulverized hopper-fed materials has been designed and installed by the Wafa Hard-Bread Co. at Filipstad, Sweden. It is a compressed air "breaker" for lifting up clumps that have formed in flour hoppers. When clumps form in the material, compressed air at a pressure of 100 psig. is blown into

TYPICAL INSTALLATIONS

PRUNES



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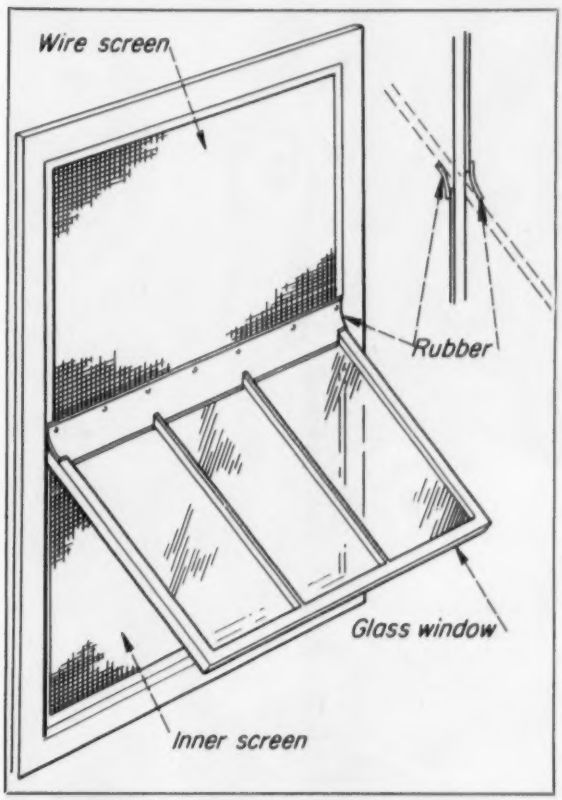
the hopper at points in the side walls selected where danger of clumping is greatest.

Included in the Wafa's system is the use of sintered-metal plates (see sketch), wall-flush, covering the air intakes. The sintered metal is tight enough to keep the flour from escaping but porous enough to permit the compressed air to flow through.

Entire system is operated from a control center.



New Design for Factory Screens

For many years food plant operators have sought a practicable means of screening factory windows with center-pivoted steel sashes. Although these windows are preferable to the end-pivoted sash type for ventilating production areas, heretofore the only successful means for screening them has been to cover entire window with a bulging screen allowing pivoted sash to open without letting insects in.

There are three very strong objections to this method: First, bulging screens interfere with use of suspended scaffolding or window "jacks" for periodic window cleaning. Then, there are some nearly flat surfaces in the bulging screens that have a tendency to collect dust and foreign matter. Finally, the cost of replacing one opening with end-pivoted sash is very expensive—approximately $60, plus cost of screen, $5.

The maintenance department at Maxwell House Division's Houston plant has made a very satisfactory window screen application, as shown in accompanying illustration.

Regular two-part flat screens are bolted to mutins of sash opening. Top half is outside sash, lower half inside sash. This arrangement requires a gap of about 2" above and below the center-pivot. It is here that Maxwell House maintenance people exercised ingeniuty.

A three-inch wide piece of stiff rubber belting is affixed to lower outside edge of upper screen. This rubber belting is V-notched to receive the outside mutins of the swing sash. (Note: If sufficient thickness of top window screen is used, bottom part of screen routs out so that rubber belting can be recessed. This closes edges more completely, and keeps rain and snow from collecting between screen frame and rubber strip (assuming screens are kept in position winter and summer).

A similar piece of 3" belting is affixed to upper part of inner screen frame and V-notched to receive mutins of inner side of sash. Upper part of the inside frame could also be routed, grooved, or recessed to receive rubber belting.

Effectiveness of these screens in resisting insects depends upon care with which the rubber baffles are fitted.

Representative costs* for aluminum frames with aluminum screen and 3" rubber baffle attached are:

44½" x 15½" screen	$3.64
42¾" x 21½" screen	3.88
59" x 15½" screen	4.56
51" x 21½" screen	4.37

If rubber belting is recessed into the screen frame cost will be slightly higher.

Plant Manager at Houston Maxwell House Plant where this method was originally developed, indicated maximum effectiveness depends upon correctly fitting screens and rubber baffles to sash. He suggests that maintenance people interested in this application purchase a few screens and fit rubber baffles. No doubt, a jig-fixture could be developed for the larger screen quantities.—*GF Technical Bulletin, General Foods Corp., White Plains, N. Y.*

* Screens were manufactured by Aluma-Life Products Company, 1733 Richmond St., Houston, Texas.

Blades Set With Quick Precision

Key problem in control of potato chip quality is to obtain slices of exactly the desired thickness, and to maintain uniformity in thickness day after day.

A tool borrowed from the metalworking industry and adapted to the purpose enables our mechanics to solve the problem.

This tool is a precision gage (see photo) with an indicating dial calibrated in thousandths of an inch. The gage is mounted in a clamp block machined from aluminum,

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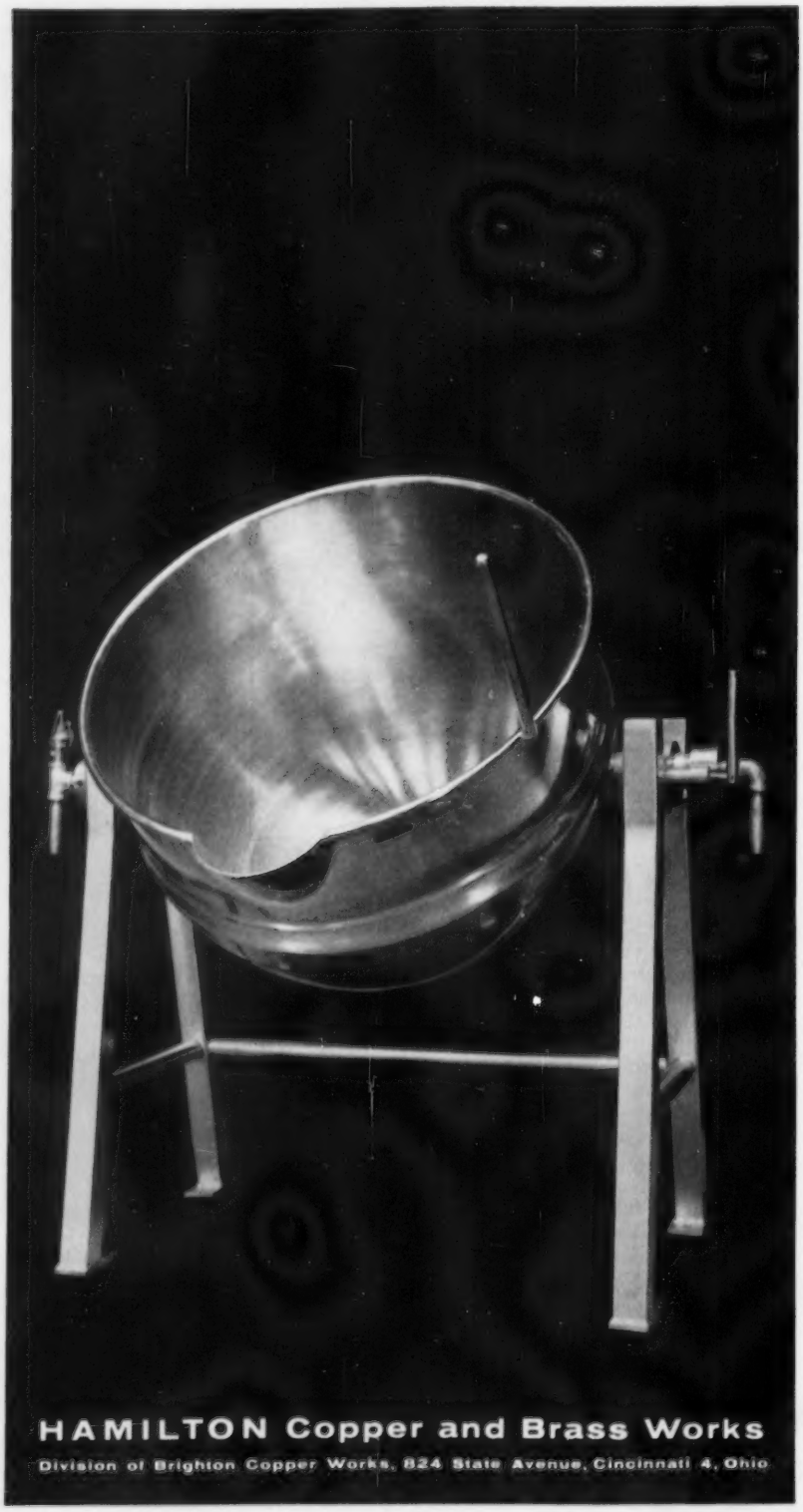

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One of our standard items is the new Hamilton Style C Hand Tilting Kettle with positive-lock tilting device. Made of stainless steel, full two-thirds jacketed. 20 to 60 gallon capacities. Kettle design provides fast, even cooking. New streamlined leg construction gives maximum support and eliminates crevices where trouble-breeding dirt and food particles normally collect.

Other types of equipment readily available include mix cookers, pressure cookers, vacuum kettles. When you need a kettle *quick* call, wire or write Hamilton—for prompt estimate and delivery information.

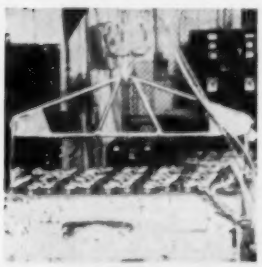
HAMILTON Copper and Brass Works

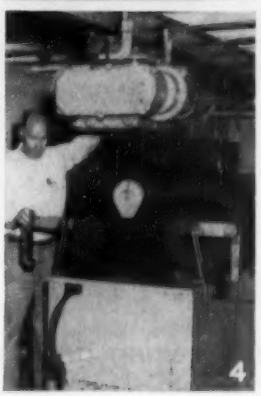
Division of Brighton Copper Works, 824 State Avenue, Cincinnati 4, Ohio

its actuating stem being zeroed with the bottom of the block. The gage body is held in a vertical position in screw tightened jaws extending from the block.

When it is necessary for the maintenance man to replace or readjust the blade on the cutting disk of the potato slicer, the gage block is placed on the disk, with the gage stem over the cutting edge of the blade. A glance at the gage pointer tells when the distance of the cutting edge of the blade from the flat surface of the disk on which it is mounted is correct. This accurately predetermines the thickness of the slices which the blade will cut.

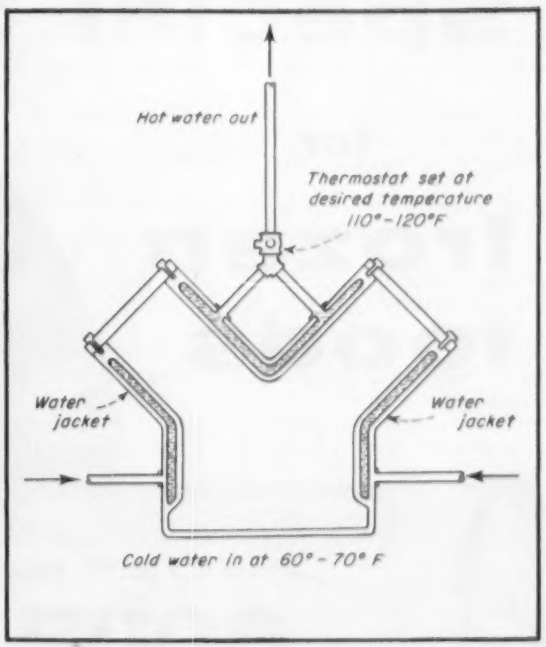
Blade adjustment is, of course, checked at different points along the length of the blade.—*W. E. Freeman, Vice-President, Production, H. W. Lay & Co., Inc., Atlanta, Ga.*





Toting Units Simplify Battery Handling

Problem of moving weighty industrial truck batteries of a variety of sizes and shapes led to development of these specialized devices for use in conjunction with hoists. Welded hanger unit (1) has hooks that swing to aid engaging, etc. Bar device (2) has range of holes for bolting-in hooks to hoist batteries of various widths. Chain-and-spreader rig (3) is advantageous when headroom is ample. And combination-hook unit (4) permits detaching inside hooks (used on small batteries) when wider batteries are to be handled.



How to Use Less Compressor Water

A thermostat (see sketch) inserted in the exhaust water line from a compressor-cooling jacket can be set at the top temperature for efficient operation of a compressor and, at the same time, it will minimize the use of cooling water.—*Charles Olson, Professional Engineer, Normal, Ill.*

Truck Operation Musts

Here are rules helpful in training truck workers for safe operation of the equipment:

1. In open aisles or roadways, truck speed must permit the vehicle to stop within 8 ft. and within 3 ft. in narrow aisles, near machinery, and in congested areas. A distance of at least 10 ft. must be maintained between moving vehicles. Greater care is necessary where floors are wet or greasy.
2. Trucks must come to complete stop and sound horn before entering doors of all buildings, approaching blind corners, turning into or crossing main aisles or entering ramps.
3. Never skid wheels starting or stopping the vehicle.
4. Driver must learn the capacity of the vehicle driven and lift no loads above that capacity.
5. Disabled trucks may be towed by another vehicle but never pushed.
6. Operator's view must never be obstructed by the load. Normally the load should be such that this does

CAN YOU USE $50?

Then here's an opportunity to get it.

Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in twelve.

Also $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

SEPTEMBER PRACTICAL IDEA WINNER was "Movable Melter for Shortening," submitted by T. H. Barnard, Clinton Foods, Inc., Clinton, Iowa.

Special Starches

for

frozen foods

What happens to your

starch thickener

between freezing and thawing?

- **Are you troubled with:**
  - — lumping or cheesy texture
  - — poor reconstitution with added liquids
  - — masked flavor
  - — clouded color?
- **Looking for a starch that will be unaffected by:**
  - — time and temperature changes
  - — other ingredients
  - — processing methods
  - — variances in equipment?

National is in a position to help you — with a variety of special starches to meet the individual needs of your foods from soup to dessert. Our food technologists will be happy to work with you. Write or telephone for samples and data.

National
STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

not happen. However, if in extreme cases loads of excessive size are unavoidable, the truck should be moved backwards, not forward.

7. Never pick up a load if forks are off-center since probable result will be spilled loads, damage to truck or surrounding area, injury to operator or other workers. Also, loads should be prepared so that the weight of a load unit itself is not appreciably off center. Loose loads should be carried in proper containers.

8. Only the driver should operate or ride on an industrial truck. Compensation claims are invited when unauthorized persons ride on forks or platforms, sitting on the battery or engine compartment, or hanging onto the truck. Except when closely supervised a fork or platform truck should never be used to hoist personnel to reach the top of piles or to reach otherwise inaccessible places.

9. Areas traveled by industrial trucks should be kept free of ruts, obstacles, grease, oil, pits, etc. These conditions invite accidents.

10. Loads carried high obstruct the operator's view, hinder maneuverability, and reduce truck stability. Loads must be carried as low as possible, considering that the higher the load is carried the more difficult it is to control.

11. Doorways, corners and other travel ways should be outlined with bright colors or hash marks. Pipes, machinery and other obstructions must be outlined in contrasting colors so that drivers can spot them immediately. Also, it is important to paint trucks in bright colors so that they may be seen by other workers.

12. At the first sign that a truck is not operating 100% efficiently, the driver should report it to the maintenance department or authorized personnel. Accidents are often caused by equipment failure.

13. Sudden or jerky stops must be avoided, otherwise the momentum of the load may play tricks on the operator. Also special care should be taken in stopping when a load is elevated for tiering or stacking.

14. If a truck has a tilting device it should be used. By tilting the uprights toward the operator, the weight of the load is brought back slightly and balance improved. Slight tilt of 8 or 10 degrees helps avoid spilling a load when rounding corners and making quick stops.

15. Railroad tracks should always be crossed diagonally instead of at right angles.

16. Keep trucks clean at all times. Dirt and rubbish make footing uncertain.

17. Operators should keep to the right and not travel in the wrong direction in one way lanes. They should watch for low clearances and observe all other normal traffic rules.

18. When hands are wet or greasy driving is dangerous. If necessary keep a towel or wiping rag handy for drying hands.

19. Operator should slow down before opening doors by remote control. Prepare to stop safely should the automatic mechanism be out of order, or if the way is not clear beyond the door.

20. Observe fire protection rules. If the truck carries a fire extinguisher it should be in good condition and the driver should be trained in its use.

21. Swinging doors should be approached squarely and in the center to avoid breaking hinges or otherwise injuring doors.

22. Use the horn but do not abuse it. Drivers must signal when approaching intersecting aisles, blind corners or swinging doors. Several short blasts are better than one long blast. A driver should signal and slow down when approaching a pedestrian who is walking away from him. However, startling others with loud blasts of the horn should be avoided. When used improperly the horn can become a hazard. It should be made clear that sounding the horn does not give the driver the right of way.

23. Trucks should never be left where they will block aisles, loading platforms or doorways, but instead parked in safe areas.

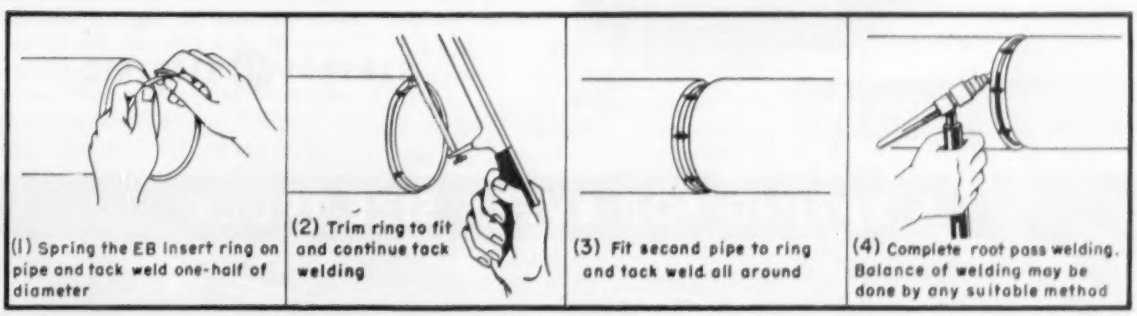
24. Operator should look before he starts, and be certain that personnel and objects do not obstruct the path of the truck, not only at leg level, but also at head level. Particular care must be taken before backing out from a load.

25. Every collision should be reported to authorized personnel even if no damage is done. And causes of all collisions with other trucks, with persons, or with other objects should be determined and corrected.

26. Crowded sections of plant should be avoided, particularly congested areas during shift changes and lunchtime.

27. If more than one truck is operating in the same area, the one following must stay at least 15 ft. behind the one ahead. Trucks should never be operated side by side, two abreast.

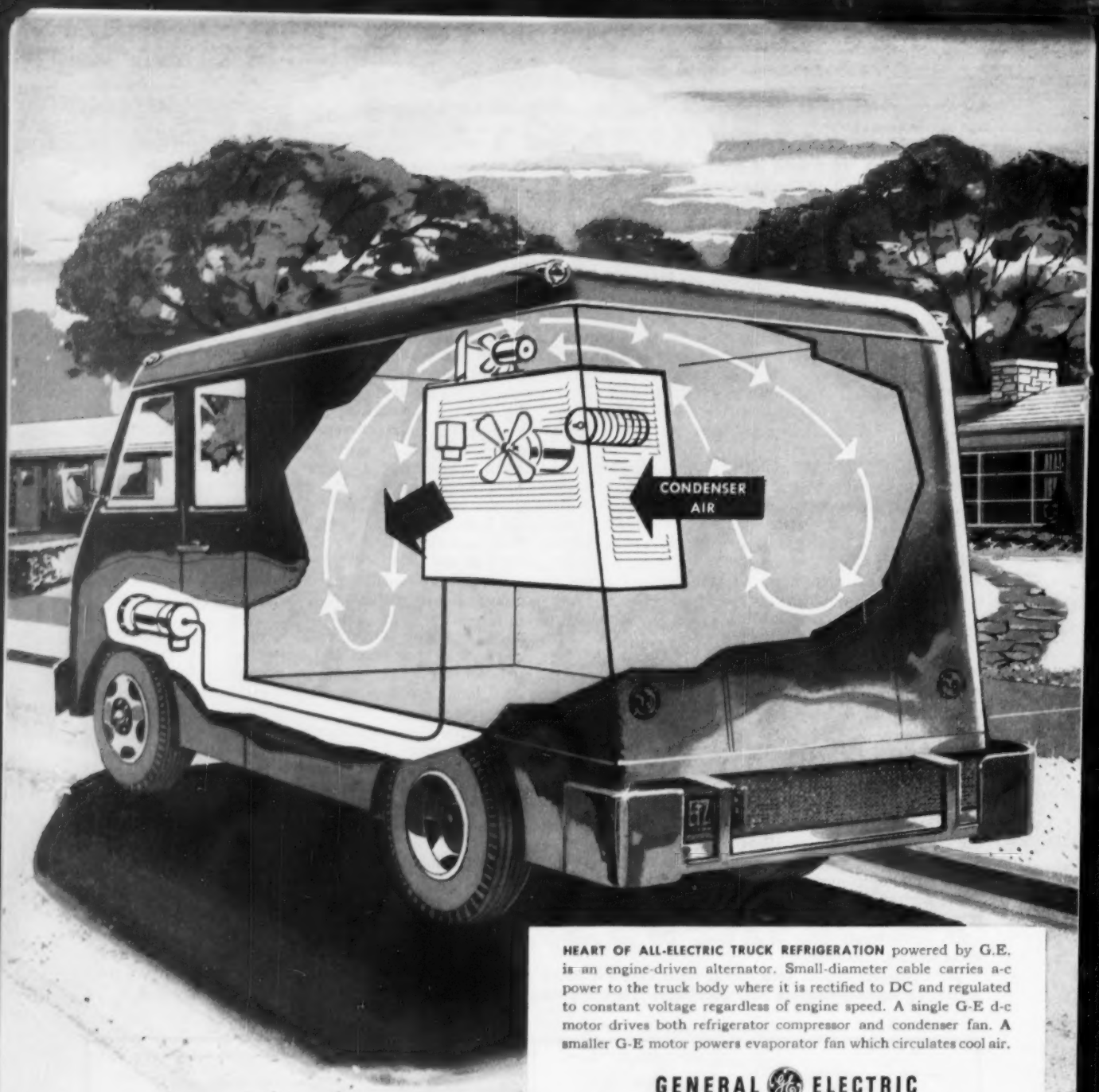
28. Hoists should be handled carefully. They should not be raised or lowered while traveling and hands should be kept off hoist tracks at all times.—*The Elwell-Parker Electric Co., Cleveland.*


(1) Spring the EB insert ring on pipe and tack weld one-half of diameter
(2) Trim ring to fit and continue tack welding
(3) Fit second pipe to ring and tack weld all around
(4) Complete root pass welding. Balance of welding may be done by any suitable method

SS Pipe Butt-Weld Process

A new process for butt-welding stainless steel pipe has been developed by the Electric Bolt Div. of General Dynamics Corp., Groton, Conn. Called the EB weld insert process, it involves the use of a specially shaped insert (see sketch) which eliminates backing rings. Easy and fast, the new process produces uniform, smooth, crevice-free welds in both sides, even though welding is done on one side only. It is especially suitable for work where the highest quality in the root pass is essential to the integrity of the completed weld.

EB Weld Inserts are marketed by Arcos Corp., Philadelphia, Pa. They come in standard ring sizes for common pipe diameters and in compositions of Types 302, 304, 316 and 347 stainless steel.



HEART OF ALL-ELECTRIC TRUCK REFRIGERATION powered by G.E. is an engine-driven alternator. Small-diameter cable carries a-c power to the truck body where it is rectified to DC and regulated to constant voltage regardless of engine speed. A single G-E d-c motor drives both refrigerator compressor and condenser fan. A smaller G-E motor powers evaporator fan which circulates cool air.

GENERAL ELECTRIC

A RATING FOR EVERY SIZE TRUCK

1/2- and 3/4-ton systems provide 40-degree temperatures for retail milk delivery. Also ideal for local delivery of other perishables including flowers and beverages.

1- and 1 1/2-ton systems have refrigerating capacity for small- and medium-size trucks used for wholesale delivery of produce, meat, frozen foods, and ice cream.

3-ton systems are designed for large over-the-road trucks and semi-trailers for long-distance movement of produce, frozen foods, and other perishable commodities.

Easily installed to operate off truck engine, the rugged G-E alternator produces 90-volt power for en-route cooling.

More room for payload results from the compactness of encased system electrical components and refrigeration equipment.

Convenient plug-in to adequately fused a-c outlet provides power for uninterrupted cooling during stand-by hours.

New all-electric truck refrigeration powered by General Electric cools round-the-clock, cuts over-all costs

IN-TRANSIT AND STAND-BY COOLING COMBINED IN ONE COMPACT, DEPENDABLE SYSTEM

Today the convenient, dependable, low-cost way to refrigerate your trucks is with new **all-electric** refrigeration powered by General Electric. Truck-refrigeration manufacturers now offer complete equipment designed around G-E electrical systems. There are units for local retail and wholesale trucks and over-the-road semi-trailers, for either cooling or freezing temperatures.

24-HOUR OPERATION

All-electric truck refrigeration powered by G.E. is 24-hour refrigeration. In-transit power is provided by a special under-the-hood G-E generator with capacity for full cooling even when the truck engine is idling. During off hours, the system operates by plug-in to a conventional a-c electric outlet.

MANY COST-CUTTING BENEFITS

All-electric truck refrigeration offers many benefits over other cooling methods —including constant temperatures, longer runs, bigger pay loads, and elimination of truck-body rust. And many types of products can now be successfully refrigerated for the first time with this new system.

SEE YOUR SUPPLIER TODAY!

If you operate trucks which require or could benefit from economical refrigeration, it will pay you to discuss new **all-electric** truck refrigeration with your equipment supplier before you commit another dollar of equipment investment.

Progress Is Our Most Important Product

GENERAL ELECTRIC

FOR MORE INFORMATION

General Electric Company,
Section A704-60, Schenectady, N.Y.

Please send me your new Bulletin GEA-6084A describing the G-E electrical system for all-electric truck refrigeration.

NAME .....

TITLE .....

COMPANY .....

STREET .....

CITY ..... STATE .....

25
October
What calories are non-fattening?
All the calories that you use up are non-fattening
The average adult uses up 2,300 to 3,200 calories a day
There are only 18 calories in a level teaspoonful of sugar
And sugar can help you cut down on the only kind of calories that can make you fat—they are the ones that come from overeating
MENU
Science shows how sugar can help keep your appetite—and weight—under control
These days when it seems as if someone is always reminding you about the calories in the things you like best, it's good to remember what calories really are.
Calories are simply units of energy!
Sugar, one of our best quick-energy foods, does contain calories. All foods do. But you use as many calories as you get from a teaspoonful of sugar in just about 7½ minutes of normal activity.
Whether they come from steak or apple pie, grapefruit or sugar, calories spent as energy can never be deposited as fat!
The only calories that can make you fat are the calories over and above your daily needs. These come from eating too much food—not any one food.
One of the reasons some people tend to eat too much, is low blood sugar level.
Recent research at Harvard and Cornell has shown that the blood sugar level plays a leading role in the healthy body's appetite regulating system.
The easiest way to stay satisfied on less food is to raise your blood sugar level between meals or just before a meal.
As you might expect, the food that does this the fastest is sugar itself.
That's why so many of the newer, more realistic reducing diets not only include sugar in foods and beverages, they make use of sugar as a real aid to weight control.
SUGAR INFORMATION, INC., New York 5, New York
This attention-arresting advertisement is now reaching nearly every home in America via the pages of
READER'S DIGEST
LIFE • THE SATURDAY EVENING POST
TIME • NEW YORKER
SPORTS ILLUSTRATED
and 50 leading big-city NEWSPAPERS

Ever look at calories this way?

It's high time for the entire food industry to take a fresh look!

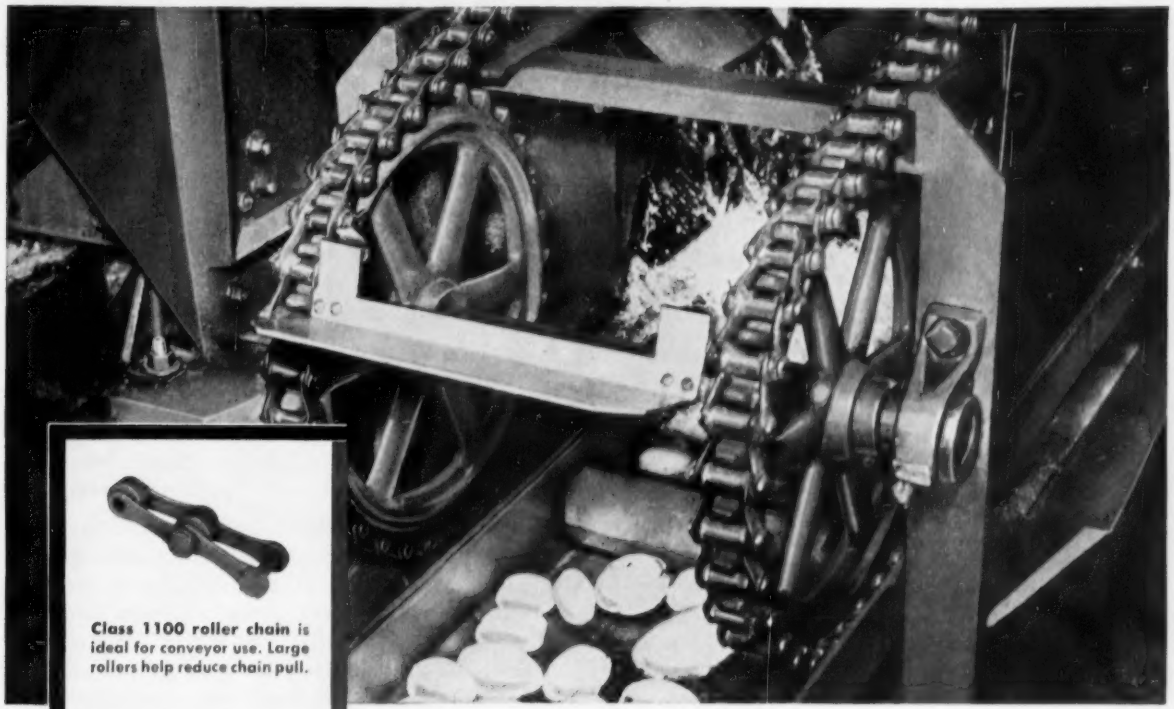
Since *all* foods and beverages *do* contain calories (if they contain any nourishment at all) and . . . since calories are simply another word for *energy* (something *everybody* wants) . . . it seems a little foolish to stand by and let the word be twisted into a synonym for fat—which *nobody* wants.

This important advertisement—putting calories in their proper perspective—will not only help sugar, but *all* good foods containing it.

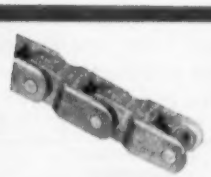
And it helps to fry the fat out of the overweighted claims about calories, which, if unanswered, tend to undermine people's friendly, *positive* attitudes toward the foods you make, distribute or sell.

SUGAR INFORMATION, INC.
New York 5, New York

Here's a WHOLE RANGE of chain for low-cost food conveying

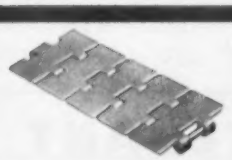


Class 1100 roller chain is ideal for conveyor use. Large rollers help reduce chain pull.



Class 400 Swivel Chain

Universal Crescent Flat Top Chain



S-815 Flat-Top Conveyor Chain

Inherent strength and durability—plus closed joint construction to eliminate entry of foreign material—make Link-Belt Class 400 pintle chain ideal for this flight conveyor handling peeled potatoes. Link-Belt sprockets, ball bearing pillow blocks and steel safety collars are other components of the conveyor.

Get the RIGHT one from LINK-BELT'S complete line

WHAT's the best chain for your particular conveying needs? The Link-Belt line is providing the right answer throughout the food industries.

Link-Belt offers low-cost chains for light conveying jobs . . . high-strength, durable chains for toughest applications. Choose from several types for maximum sanitation. For drag chain installations, other types with ample sliding surfaces are available. And all can be economically adapted to specific service through Link-Belt's wide selection of versatile attachments.

Near you is a Link-Belt office or authorized stock-carrying distributor where you can learn the facts about Link-Belt's complete line of chain for sure, steady conveying and drive service. From either, you'll get a reliable recommendation that will meet your requirements exactly.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 15); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,914

STURTEVANT

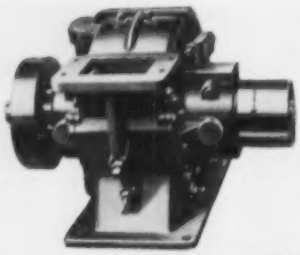
Laboratory Equipment...

assures accurate samples... cuts laboratory sampling costs

Sturtevant laboratory equipment have all the features of full-sized production machines with extra accuracy and wider range of adjustment built-in. They are fast... provide true samples of every batch processed.

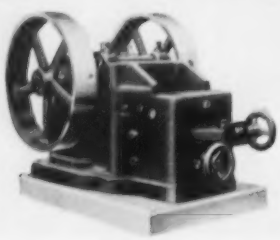
All Sturtevant machines have "open-door" accessibility which permits quick, thorough cleaning... prevents the possibility of previous batches from contaminating new samples. Their rugged construction assures round the clock operation with practically no maintenance.

Investigate Sturtevant equipment for your laboratories. They will help you cut sampling costs... improve product quality... increase sales. Write for catalog, today.



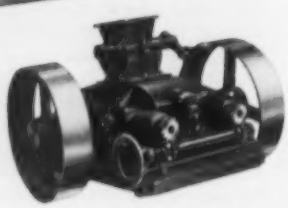
LABORATORY SWING-SLEDGE MILLS

Capable of reducing soft, moderately hard and tough or fibrous materials to any degree of fineness between 1 in. and 20 mesh. The patented "Open-Door" feature permits ready accessibility for cleaning.



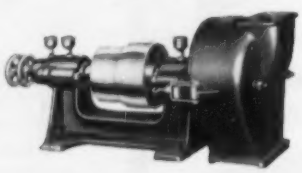
LABORATORY JAW CRUSHERS

Special Roll Jaw action simplifies close regulation of the product with capacities varying from 300 to 400 lbs. per hour at finest settings, to 1000 or 2000 lbs. when opened for coarser work. Each part of the crusher is accessible for quick and easy cleaning.



LABORATORY CRUSHING ROLLS

First designed especially for laboratory sampling work, Sturtevant Crushing Rolls are used regularly in many plants where there are limited out-puts. Range of output for the 8 x 5 size is from ½ in. to 20 mesh — and for the 12 x 12 size from ¾ in. to 20 mesh.



LABORATORY SAMPLE GRINDER

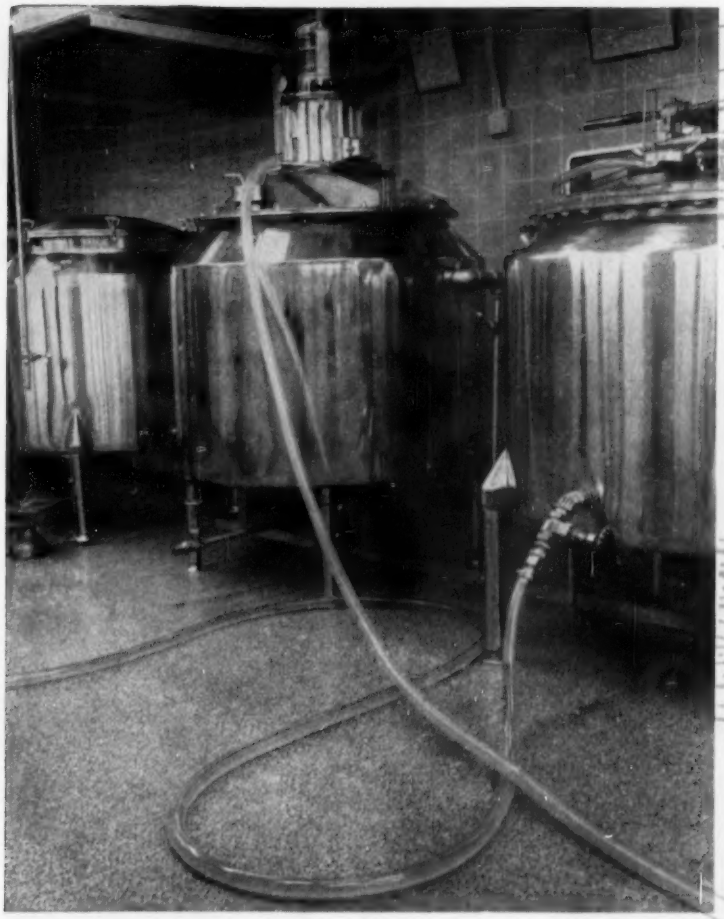
Laboratory Sample Grinders are of the "Open-Door" disc type and are capable of very fine work, producing products as fine as 100 mesh (coarser if desired) when working on dry, friable, soft or moderately hard materials. Simply turn hand wheel to provide product regulation from 10 to 100 mesh.

STURTEVANT MILL COMPANY

106 Clayton Street, Boston 22, Mass.

Designers and Manufacturers of

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS



TRY THIS

flexible glass

For Safer FLUID FOOD TRANSMISSION

Tygon flexible plastic tubing well deserves to be called "the flexible glass." It is crystal clear for easy solution visibility. Flexible as a piece of string, it simplifies set-up and dismantling of lines. Tough, abrasion-resistant, and unbreakable, it can take the roughest kind of service. It doesn't chemically deteriorate with age; it cleans easily and thoroughly, can be steam sterilized if desired. It is endorsed and approved by medical authorities and manufacturers of food processing equipment for safe, pure handling of food products.

Yes, Tygon flexible plastic tubing is the clear solution to many fluid handling problems. It's available in bore sizes from 1/16th inch to 2 inches. And for high pressure use (250-300 psi) is available with an outer braid reinforcement of stainless steel.

PRODUCT OF

U.S. STONEWARE

Akron 9, Ohio

Plastics and Synthetics Division

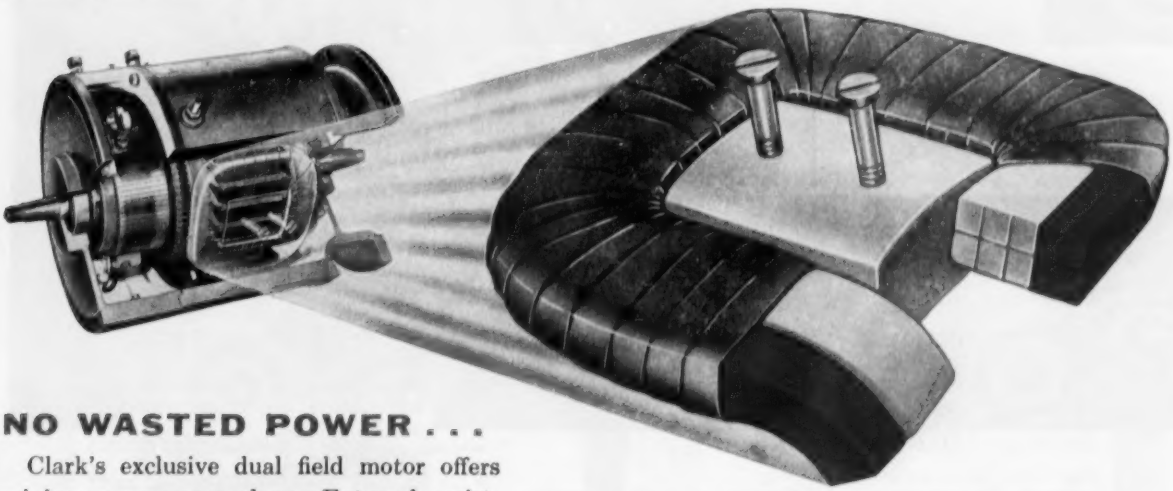
Write for Bulletin T-87 just off the press — 24 pages of technical data describing how and where you can use Tygon Tubing. U. S. Stoneware Co., Akron 9, Ohio, Plastics and Synthetics Division.

IN EVERY INDUSTRY,

Reaching for the ceiling, efficient, fume-free Clark Electric stacks cartons of paint at White Auto Sales, Wichita Falls, Texas. In *every* industry, Clark Electrics work a longer cycle . . . do *more* work.

CLARK ELECTRICS
work a longer cycle . . .
do more work !

There just isn't any other power type that can move material at a lower cost per ton-mile than a Clark Electric. Clark's field-tested gear train and exclusive dual field, high torque motor provide maximum efficiency under the most severe operating conditions.



NO WASTED POWER . . .

Clark's exclusive dual field motor offers minimum amperage draw. External resistance is utilized only in the first two points of power, thereby eliminating wasteful power losses and overheating. Result! Your battery works a longer cycle.

At 4th point of power Clark's exclusive *dual field construction* is achieved by eliminating half the field resistance (indicated in red).

EFFICIENT POWER-TRAIN . . .

Here's why Clark's gear train provides more power . . . more work. Final reduction is taken at the point where torque is actually being applied—at the wheel. This reduces torque load on all shafts when breaking away a heavy load, and makes the most effective use of available torque to provide more work.

Write for the booklet "Electri-Facts" showing cutaways of the power train, control circuit, hydraulic system, and other important components.

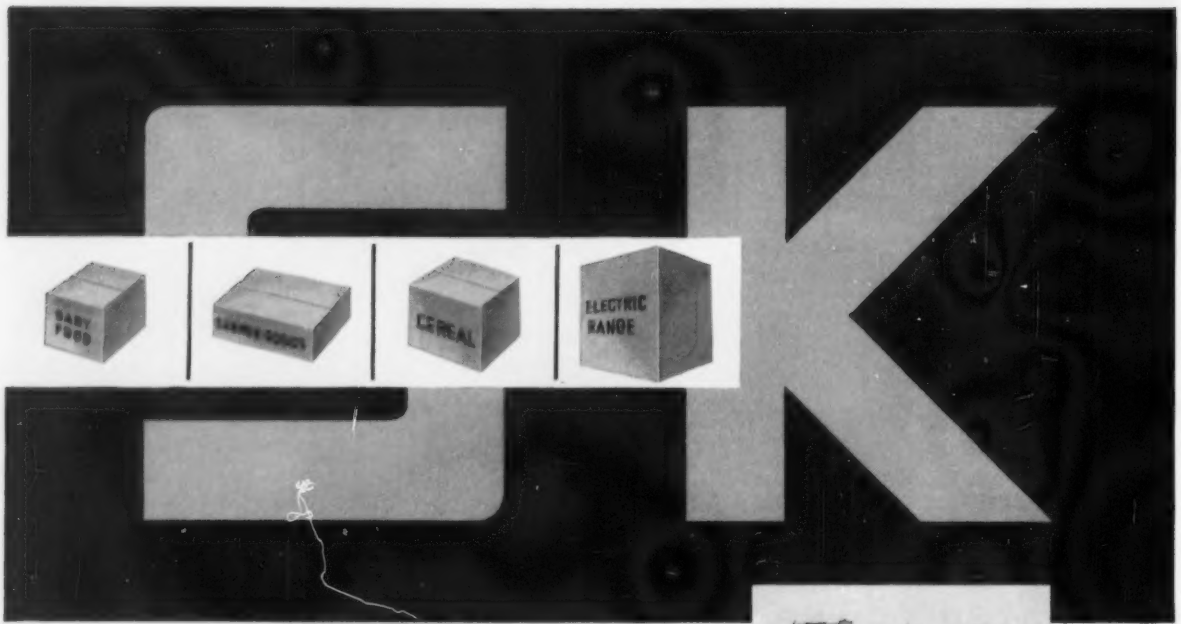
CLARK® EQUIPMENT

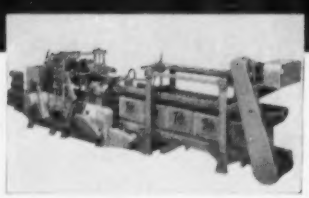
Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 14, Michigan

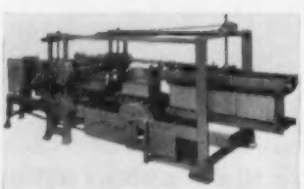
For more data, circle this page number on card at back →

S-K GLUERS and SEALERS

The best way to close ANY shipping case







Standard-Knapp Gluers and Sealers are built to handle any fiber or corrugated shipping case, big or little, long or short. S-K Gluers and Sealers range from hand fed compression units to fully automatic machines that detect and adjust for a variety of case sizes.

With S-K Gluers and Sealers you are assured of strongly bonded, neat, and uniformly squared cases. Gluing is the most economical way to close a case, and remember, glued cases are easy and fast to open.

FOR EFFICIENTLY INTEGRATED operations, use Standard-Knapp Case Packers in combination with Standard-Knapp Gluers and Sealers. S-K packers assure savings on can, bottle, carton, bag or glass container lines.

For complete information on Standard-Knapp Gluers and Sealers write Dept. F. Or ask for your copy of the Emhart Condensed Catalog of over 275 machines.

Only the best is good enough

STANDARD-KNAPP

DIVISION OF EMHART MFG. CO.

PORTLAND, CONNECTICUT

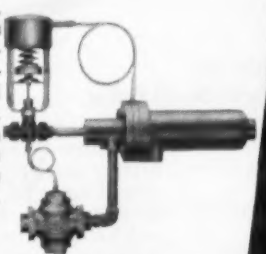
FULTON SYLPHON

TEMPERATURE REGULATOR HEADQUARTERS, U.S.A.

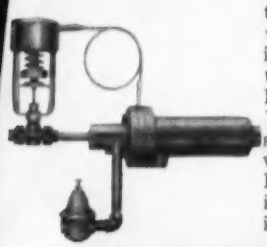
Here are two more reasons why engineers looking for better ways to regulate temperatures . . . look first to Fulton Sylphon. These two new Mixers combine the most modern design with the time-tested Sylphon Bellows principle of control. Both types provide close, accurate control with an automatic shut-off safety feature. Quick, easy installation involves only pipe connections. Use the convenient coupon for detailed descriptions of these new Mixers.

HOT-COLD WATER MIXER—No. 1350 Series

Mixes hot and cold water to desired temperatures. Unaffected by variations in water pressure. Provides an accurate controlled source of tempered water for industrial, chemical and food process requirements, as well as wash basins, gang showers and similar installations.



STEAM-WATER MIXER—No. 1360 Series



Mixes steam with water to provide tempered water at low cost. Steam is injected directly into the water, utilizing every BTU of heat energy. Water is heated as used; steam is consumed only when water is drawn. Ideal for industrial, chemical and food processing systems using steam.

Mr. Controls

Robertshaw-Fulton

CONTROLS COMPANY

FULTON SYLPHON DIVISION

FULTON SYLPHON DIVISION

Knoxville 1, Tennessee

Please send descriptive literature on:

- ☐ 1350 Series Hot-Cold Water Mixer
- ☐ 1360 Series Steam-Water Mixer

Name_____

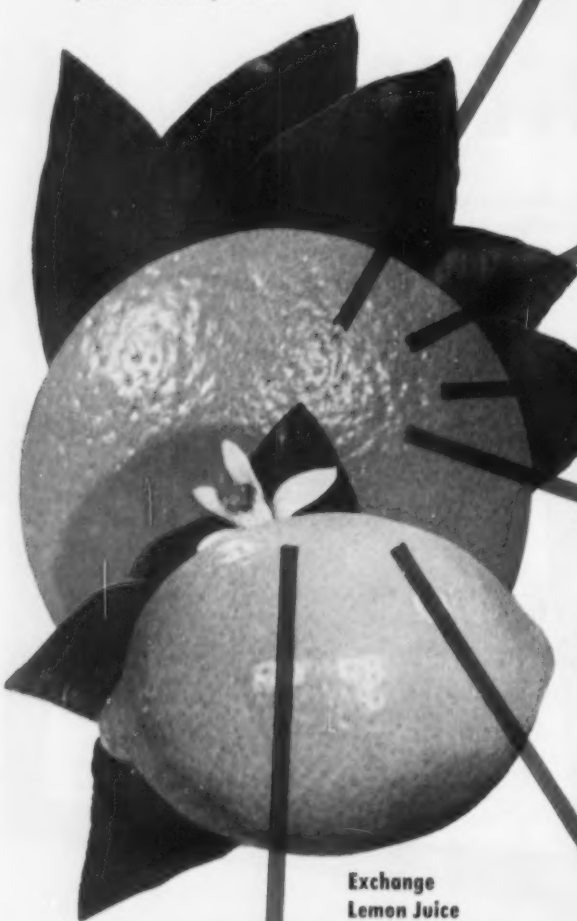
Company_____

Address_____

City_____ State_____

Look to Sunkist
for progressive research in food processing

Yes, in every field of food processing, the Sunkist Growers laboratories are making ever-widening contributions to the increased quality of food products. Here are some typical Exchange Brand product developments.



Exchange Oil of Orange

Always consistent, always outstanding in flavor, strength and aroma. An essence you can rely on. Made from fruit grown in the famous Sunkist groves of California.

Exchange Oil of Lemon

The 4-to-1 favorite over all other lemon oils combined! The reason is the superior flavor that comes only from California-grown lemons processed by exacting Sunkist standards.

Exchange Preserver's Pectin

Here is *even* jell strength that gives you consistent, complete reliability in setting control.

Exchange Low Methoxyl Pectin

A natural fruit pectin that jells without sugar. Completely tasteless, permitting the use of the most delicate flavors. Pies made with Exchange Low Methoxyl Pectin won't "run" or "weep" when cut—and you have never tasted such natural juicy fruit flavor. Famous too for aspics, jellied fruit or vegetable salads, dietetic preserves or non-sugar jells.

Exchange Lemon Juice

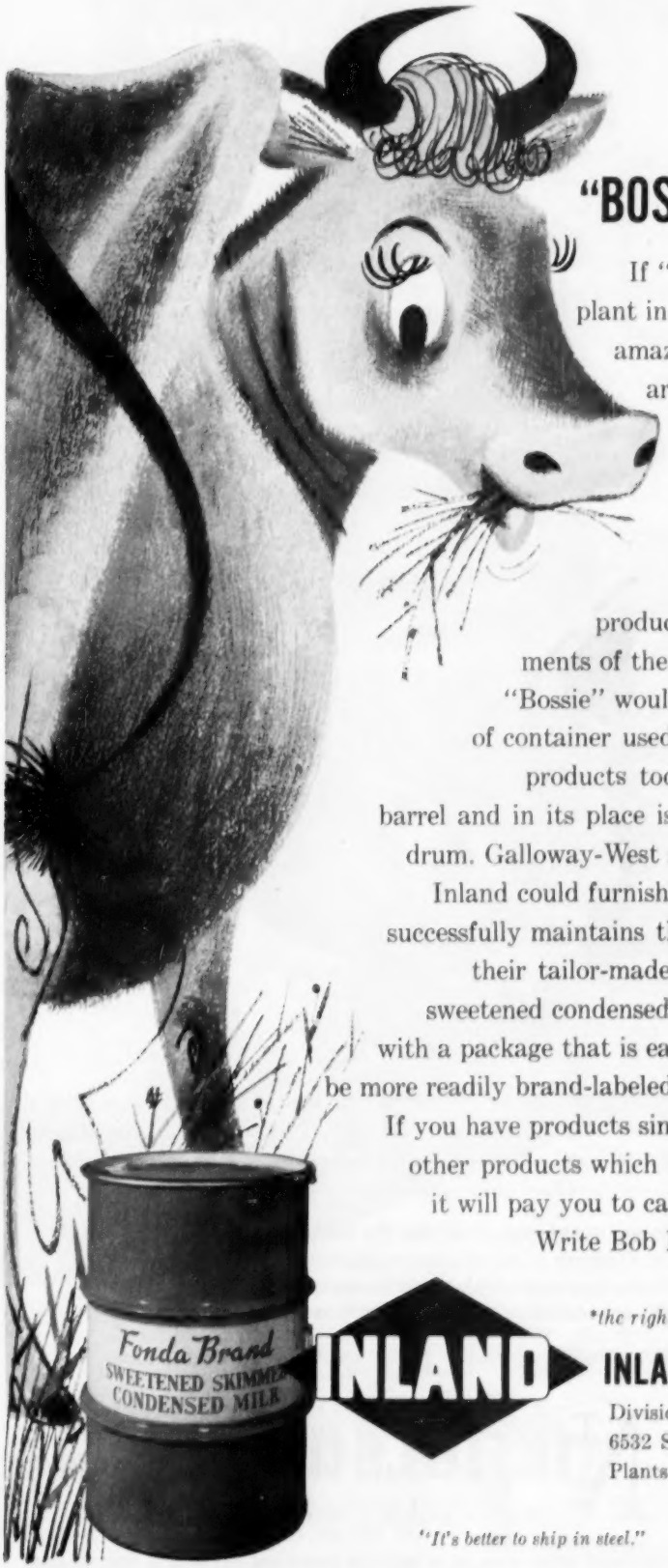
Nothing can match lemon juice for bringing out the natural flavor of *any* food product. It's a superior acidulant in the preparation of mayonnaise, fruit cocktail, figs, fruit nectar, prunes and other heavy-syrup products. Highly effective as an anti-oxidant in processing frozen foods. Citric acid molecules have also been established as effective in the retarding of mold growth. Available in concentrated or single strength form.

Sunkist Growers

Exchange ®

PRODUCTS DEPARTMENT • ONTARIO, CALIFORNIA
400 West Madison Street, Chicago 6, Illinois
99 Hudson Street, New York 13, N. Y.
318 Cadiz Street, Dallas 2, Texas

*"Another product safely shipped in Inland 'protection-eered' containers"**



"BOSSIE" WOULD BE AMAZED!

If "Bossie" could visit the Galloway-West plant in Fond du Lac, Wisconsin, she would be amazed to see what happens to her milk! It arrives at one of the most modern and sanitary milk processing plants in the country in the familiar farmer's milk can. A few hours later, it leaves in the form of a variety of liquid, semi-solid and powdered milk products, ready to meet the exacting requirements of the dairying, baking and candy industries. "Bossie" would be even more amazed to see the type of container used by Galloway-West to ship their milk products today. Gone is the old-fashioned wooden barrel and in its place is a modern, sanitary-lined, Inland steel drum. Galloway-West switched to steel when they found that Inland could furnish them with a lined drum that not only successfully maintains the critical quality control standards of their tailor-made milk products, such as their "Fonda" sweetened condensed skimmed milk, but also provides them with a package that is easier to handle, more attractive and can be more readily brand-labeled.

If you have products similar to those of Galloway-West, or any other products which require a "protection-eered" container, it will pay you to call on Inland Steel Container Company. Write Bob Boecher, Room 245-D, for information.

**the right container with the right lining for your products.*

INLAND

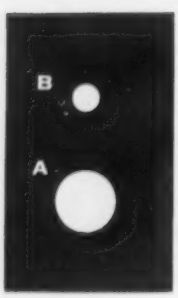
INLAND STEEL CONTAINER COMPANY

Division of Inland Steel Company
6532 South Menard Avenue • Chicago 38, Illinois
Plants: Chicago • Jersey City • New Orleans

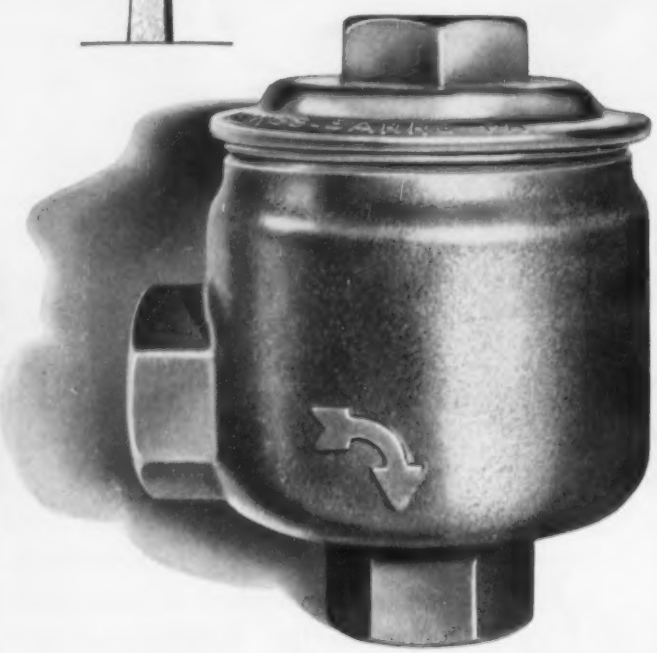
"It's better to ship in steel."

TALK ABOUT

Capacity



Discharge orifice of 1" NICHOLSON trap (A) compared with other types of same size (B). Nicholson's greater—in every size!



Compare capacity of a Nicholson Steam Trap with any other trap of same size. Greater capacity—right across the board—means Nicholson Industrial Traps discharge condensate and air from steam lines and process equipment *faster*, more *effectively*. In toughest food processing service, Nicholson's pay off 4 ways:

- **lower initial cost—more for the money**
- **less upkeep expense—minor maintenance**
- **faster warmup—high, even temperatures**
- **faster production—increased 20% to 30%**

Where performance counts, specify Nicholson. Write for *Catalog 953*.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS

14 OREGON STREET, WILKES-BARRE, PA. • SALES AND ENGINEERING OFFICES IN 58 PRINCIPAL CITIES

much more than a common carrier... JEFFREY HOLLOW-PIN chain

You are not just looking at the "hole in the doughnut." Functional use of Jeffrey Hollow Pin Chain has many applications. In the baking industry, for instance, this chain makes it easy to attach trays and other fixtures to be conveyed. Supporting rods are simply inserted in the pins. The chain runs on rollers; gives smooth operation and firm support.

Jeffrey offers a full line of Hollow Pin Chain in a variety of pitches to suit your particular spacing requirements. Pin and bushings are hardened and ground for smooth, tough wearing surfaces. Sidebars and rollers are heat-treated to specifications for your application.

To improve the quality and performance of your equipment, let Jeffrey engineers help you determine the right chain or other component parts.

Jeffrey Hollow Pin Chain takes trays of bread on a smoothly-timed trip through bakery oven.

JEFFREY Equipment for the Food Industry

Apron, Belt, Scraper and Spiral Conveyors • Batch Weighing and Proportioning Systems • Cane and Pulp Shredders • Garbage Grinders • Vibrating Feeders • Conveyors • WAYTROLS • Car Pullers • Power Scoops • Juice Strainers • Sugar Minglers • Power Transmission Machinery • Bucket Elevators • Chains and Sprockets • Coolers • Packers

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

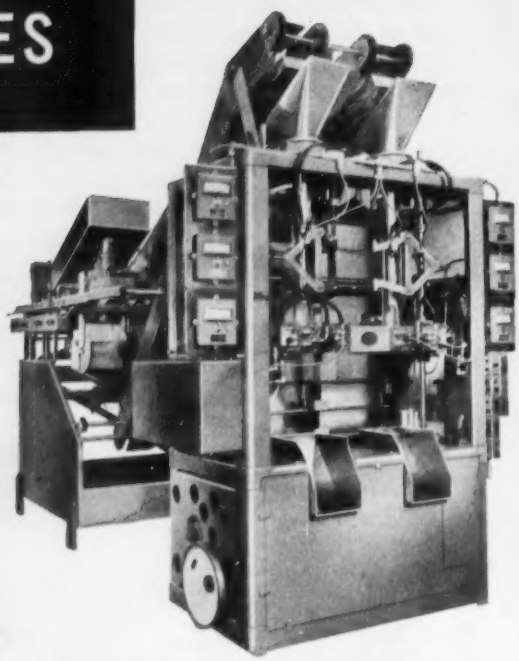
IF IT'S MINED, PROCESSED OR MOVED ...IT'S A JOB FOR JEFFREY!

For more data, circle this page number on card at back →

ONLY TRANSWRAP

Gives You Completely Automatic Packaging

WITH THESE NEW DESIGN FEATURES



Model C Transwrap shown is for low head-room installations. It features floor-level feeder and automatic transfer unit.

Now available: 10 major new design features in the Model C Transwrap. You benefit from nearly a year's redesigning—the kind of engineering updating you expect from Package. Check these new features and see how much *more* Transwrap gives you.

- *Simpler Design*—Operation has been simplified. Fewer parts are used for more efficient, high-speed packaging.
- *New Sealer*—Unique resistance-type sealing and more accurate temperature control permits the use of the latest films—like polyethylene and vitafilm—speeds operations.
- *Improved Cut-off*—New mechanical knife will give complete single, alternating or perforating partial cut-off.
- *New Electric Eye*—Redesigned electric eye mechanism means accurate registration of printed materials.

Model C Transwrap will produce up to 45 packages a minute in bag sizes from 2 7/16" to 9 7/16" wide and 4" to 14" long. It handles fine powders, granules, semi-liquids, liquids and free-flowing solids. To find out more about all the new Transwrap features, write or phone our nearest office

EAST LONGMEADOW, MASSACHUSETTS

NEW YORK • PHILADELPHIA • BOSTON • CLEVELAND • CHICAGO • MINNEAPOLIS
ATLANTA • DALLAS • DENVER • LOS ANGELES • SAN FRANCISCO • SEATTLE • TORONTO

PACKAGE MACHINERY COMPANY

E. A. Hamann (left), Power Generation Engineer and Robert Best (right), Superintendent of Utilities, go over lubrication records with Bill Schall, Standard Oil lubrication specialist. Bill Schall has been providing technical sales service to Standard Oil customers since 1943. Bill is an engineer with a B.S. in engineering from Georgia Tech., and a graduate of Standard's Sales Engineering School. Customers of Bill's find this experience and background pay off *for them.*

Anheuser-Busch Turbine Lubrication Record

Generator Capacity	Start up and NONPAREIL Installation Date	Date of Last Oil Analysis	Neutralization Number
3,000 kw.	Oct. 2, 1930	July 20, 1954	0.03
3,000 kw.	Oct. 2, 1930	July 22, 1954	0.02
2,500 kw.	June 10, 1940	July 20, 1954	0.03
7,500 kw.	Jan. 2, 1948	July 22, 1954	0.03
7,500 kw.	July 26, 1951	July 22, 1954	0.01

Anheuser-Busch still using same turbine oil after 24 years

. . . NONPAREIL

For more than 24 years the Anheuser Busch Brewery, St. Louis, Mo., has been operating two 3,000 kw., turbines using NONPAREIL Turbine Oil. Three more turbines added to the system in 1940, '48 and '51 have also used NONPAREIL since beginning operations. The reason for choosing NONPAREIL is clear; it is guaranteed for the life of the turbine.

Since the initial installation, Anheuser Busch has not had to replace a NONPAREIL Turbine Oil fill. Neutralization number is always far below 0.15 mg. KOH/g., the degree of acidity Standard Oil guarantees NONPAREIL will not exceed. At nearly all times neutralization number is on the order of 0.03 mg. KOH/g. (See chart).

In all these years, oil systems have remained clean. There has been no problem of oil acidity in any of the five turbines. The delicate art of brewing world famous Budweiser goes on without concern over power failure due to lubrication failure.

Like to know more about NONPAREIL and its possible use in your turbines? In the midwest call your nearby Standard Oil lubrication specialist. Or, contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

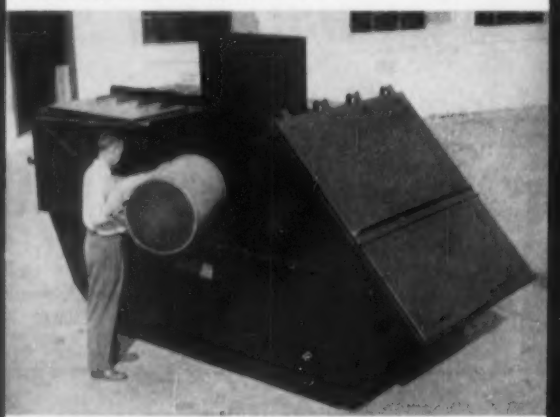
STANDARD OIL COMPANY
(Indiana)

COLLECT IT

AS IT ACCUMULATES — SOLIDS, POWDERS, SLUDGE, LIQUIDS
RAW MATERIALS, FINISHED PRODUCTS, WASTE MATERIALS

Heavy waste is dumped into an open container at a foundry in New York. The first step in the LOAD LUGGER SYSTEM of materials handling is to place a number of containers at strategic points to collect material as it accumulates, reducing handling at the point of origin.

Light material accumulates in an open container with high sides at a shipping carton plant in Louisiana. Rugged LOAD LUGGER containers are built of welded steel, have deep leak-proof bottoms, hold from 1½ to 14 cubic yards and more, and handle all types of material.



It is easy to load this 14-cubic-yard LOAD LUGGER container of a St. Louis contract hauler. It fills to the top without raking and is wind-proof and rat-proof. A model with rubber seals and latches is also theft-proof, fly-proof, dust-proof, and almost odor-proof.

PICK IT UP

ALREADY LOADED — NO LOST TIME AND NO LOADING CREWS
LET ONE TRUCK AND DRIVER DO IT ALL — REPLACING MANY

A full container is picked up at a refinery in Indiana. The second step in the LOAD LUGGER SYSTEM is for one driver and his truck equipped with a hoist-body to pick up full containers on a regular schedule. This procedure does away with lost time and loading crews and eliminates the need for several conventional trucks and their drivers.

A bearing manufacturer in Ohio picks up a full container of dolomite. LOAD LUGGER hoist-bodies (flat-bed truck bodies with a pair of hydraulic-powered hoisting arms) handle pay loads of up to 18,000 pounds and more. They are easily mounted on any truck chassis of suitable capacity, and all controls are installed in the cab.

An open container used for accumulating industrial wastes is picked up by a Chicago contract hauler. For greater safety, LOAD LUGGER hoist-bodies lift containers with four-point suspension and have double-acting hydraulic cylinders for positive control at all times.

LOAD LUGGER®

ENGINEERING B-W PRODUCTION

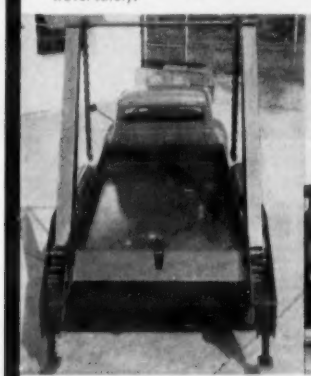
- FLAT-BED TRUCK BODIES WITH HYDRAULIC HOISTING ARMS
- LEAK-PROOF TILT-DUMP CONTAINERS FOR BULK MATERIALS

HAUL IT

IN MANY TYPES OF CONTAINERS — OR ON THE TRUCK BED
IN PLANT AND OVER THE ROAD — ON YOUR TRUCK CHASSIS

A city truck in Ohio hauls a full container of repair materials. Government approval is evidenced by the many such municipal, state, and federal installations. Hauling full containers is the third step in the LOAD LUGGER SYSTEM, and over-the-road hauls are as feasible as in-plant because of the use of standard truck chassis.

A full container of residue materials is hauled at a corn products processing plant in Illinois. LOAD LUGGER hoist-bodies carry containers well forward for correct load distribution and cradle them between steel sidewalls for greater travel safety.



LOAD LUGGER hoist-bodies also carry materials or equipment directly on their flat beds, loading and unloading heavy objects with their hoisting arms.

This special hoist-body of a Michigan telephone company transports heavy cable reels. Such new uses for LOAD LUGGER equipment are constantly being developed.

DUMP IT

BY TILTING CONTAINER VERTICALLY OVER REAR APRON, OR
DELIVER IT BY EXCHANGING FULL CONTAINER FOR AN EMPTY

Spent solvents are dumped into incinerator tank at a drugs and medicines manufacturing plant in Michigan. Delivering full containers or dumping their loads is the fourth step in the LOAD LUGGER SYSTEM. Returning empty containers then completes the cycle.

Metal scrap is dumped and spread in the yards of a scrap metals service company in Iowa. LOAD LUGGER hoist-bodies handle more pay load on a given truck chassis, because they are lighter than comparable equipment. And their patented simplicity, clean design, and sturdy construction make them cost less to buy and maintain.

Equipment of a Miami contract hauler in the dumping position. The LOAD LUGGER hoist-body has outrigger jacks to protect rear springs and axles from injury while picking up and putting down heavily loaded containers, but it neither needs nor uses these jacks while tilting container over rear apron to dump or spread the load.

ENGINEERED, MANUFACTURED, AND MARKETED BY

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KALAMAZOO DIVISION
SUCCESSOR TO BROOKS EQUIPMENT & MFG. CO.
BORG-WARNER CORPORATION
EXPORT SALES: BORG-WARNER INTERNATIONAL CORP., CHICAGO

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City, zone, state

For more data, circle this page number on card at back → 31

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Rubber blows a boxcar full of flour

A typical example of B. F. Goodrich improvement in rubber

THAT special railroad car holds 50 tons of flour—more than the average family would use in a lifetime. But some bakeries need that much rushed to them every day.

Loading flour into cars like this used to take a gang of men, who had to struggle with heavy bags which cost money to make and fill, and more money to handle. Then a midwest miller saw an oil tanker being loaded by B. F. Goodrich hose—wondered if bulk shipments of flour could be handled as fast.

He talked it over with B. F. Goodrich men, and together they worked out the "filling station" method you see in the picture. B. F. Goodrich engineers came up with an improved kind of hose that's light, easy to pull around, won't flatten or kink on sharp corners. Workers say the hose is a cinch to operate. Poke it down a hatch, turn on the blower, and the flour pours through at a fast 800-pounds-a-minute clip. Savings? Plenty! Each car loaded this way saves some bakery about $250.

Product improvement like this is *always* going on at B. F. Goodrich. New ways are constantly being found to make hose, conveyor belts, V belts work better, last longer. No product is ever regarded as "finished" or standardized.

How this cuts your costs: Because of these improvements and because B. F. Goodrich is one company that will *never* lower its quality standards, you can be sure of top performance and real money savings when you specify B. F. Goodrich. To find out about the latest improvements in the rubber products your company uses, call your BFG distributor or write *The B. F. Goodrich Company, Dept. M-498, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

You'll SPEED PRODUCTION with WEAR·EVER *Aluminum* FOOD HANDLING EQUIPMENT

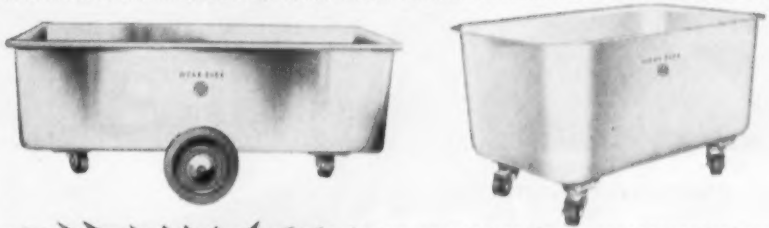
Ingredient Containers

Drums, under-counter bins, stacking containers, tubs—what's *your* plant's requirement? Chances are Wear-Ever can fill it—in the capacity, style and dimensions you need.

Light in weight, long on wear, and specially designed for mobility and easy cleaning, Wear-Ever's full line is made exclusively of friendly-to-food aluminum to protect the purity of your product.

Trucks

These easy-rolling, lightweight Wear-Ever containers keep your in-plant transportation in high gear. Type at left has 1000 lb. capacity, specially reinforced corners and new type wheels that permit lubrication inside bearings. Model at right holds 225 lbs., has swivel type casters with hard rubber wheels.



Transport Boxes

Here's real portability in a wide container line to suit your requirements. Handy tote box at top stacks when full, nests when empty. All styles and sizes are light in weight, easy to handle; feature sanitary open bead for easy-cleaning. Hard, wrought alloy assures long dependable service.

Setting records for efficiency in leading plants everywhere!

All over the country, more and more plant managers are finding items in Wear-Ever's wide line that adapt perfectly to their special handling and manufacturing needs. Chances are, Wear-Ever has a standard item that's ready-made for *your* specific production problems, too. Just call your Wear-Ever salesman. He'll be glad to be of help. Or write for our catalog.

MAIL COUPON TODAY!

WEAR·EVER *Aluminum* **UTENSILS**

THE ALUMINUM COOKING UTENSIL CO., INC., WEAR-EVER BLDG., NEW KENSINGTON, PA.

The Aluminum Cooking Utensil Company, Inc.
310 Wear-Ever Bldg., New Kensington, Pa.
GENTLEMEN: *I'd like to know more about your Food Handling Equipment.*
☐ Send me your catalog. ☐ Have your representative see me.

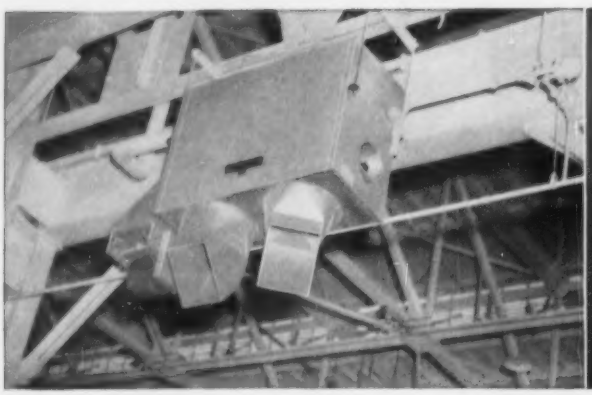
NAME .....

TITLE .....

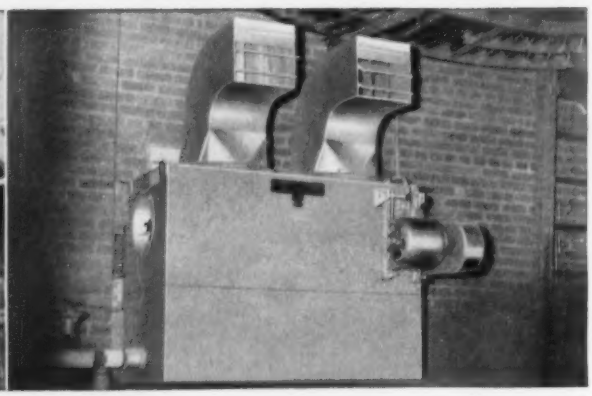
Fill in, clip to your letterhead and mail today.

NEW ITEM! *Wear-Ever's new Nickel Scouring Cloth. Won't scratch, won't mar, far outlasts ordinary scouring cloths. At your dealer's.*

. . . keep your plant warm and ventilated with *efficient, compact* "Buffalo" unit heaters



SUSPENDED "LOWBOY" HEATS, VENTILATES



"HIGHBOY" WITH FRESH AIR INTAKE

- *Easy, fast installation* with their sectionalized construction. Suspended or floor models to suit your layout!
- *Efficient, non-freeze aerofin coils* radiate maximum heat — permit space saving construction!
- *Smooth, quiet, stable performing* "Buffalo" mixed-flow fans give effective heat distribution!
- *Exclusive "Buffalo" swivel outlets* aim flow of air just where you want it!
- *Models with filter section* to provide fresh, clean makeup air!
- *Easy maintenance* — fan bearings lubricated from outside bearing bowl. All parts standardized, easily accessible!
- *Long life that means low costs!* Heavy-duty paneling, fans, swivel outlets, coils and bearings are built to last.

- *The "Buffalo" "Q" Factor* — the built-in Quality that provides trouble-free satisfaction and long life — in any "Buffalo" product you buy.

WRITE FOR BULLETIN 3704A! Gives full details on the right units to handle your heating, ventilating or makeup air problem — including air diffusion distances for each unit and capacity up to 35,000 cfm. Write for your copy today!

"Buffalo"

BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

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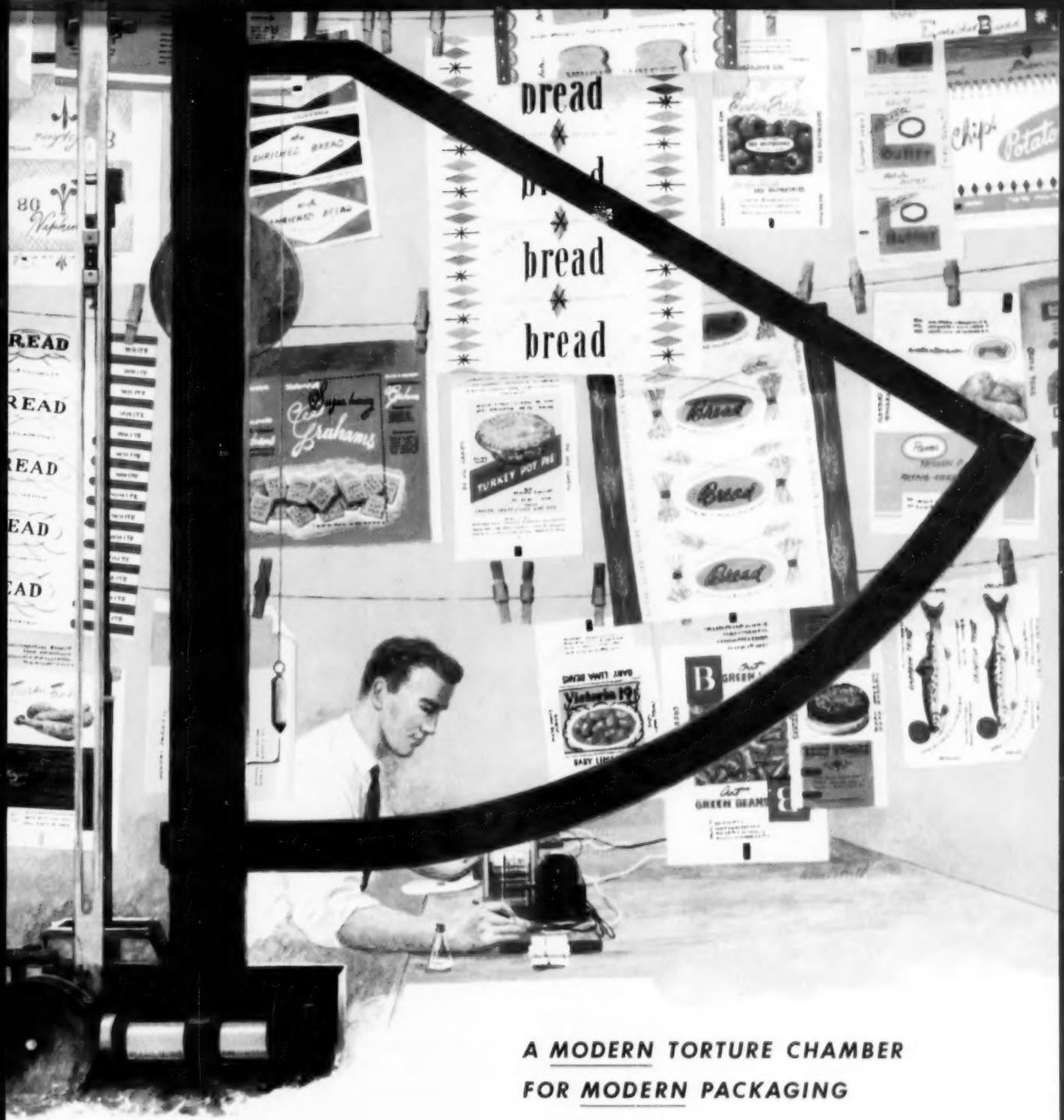

A MODERN TORTURE CHAMBER FOR MODERN PACKAGING

Your package is subjected to the most vigorous and exacting punishment in Crown Zellerbach's Research Laboratories, the most modern and complete in the packaging industry.

All Western Waxed wrappers are completely tested under the most varied and extreme climatic conditions, from arctic cold to tropic heat. These same rigid standards of quality control apply throughout every step of our completely integrated operation from tree seed to package.

Yes, we torture your package to guarantee that your product will have maximum protection and appeal, from initial wrapping to final consumption.

another reason why Western Waxed packaging materials are the best

WESTERN WAXED PAPER

DIVISION CROWN ZELLERBACH CORPORATION

Every 10 Seconds

there's a completely new filter face on a

DICALITE FILTERCAKE

For all practical purposes, that means that you have a *continuously fresh* filtering surface—all the time—for consistent clarity and constant flow rate. The mechanism of this is simple. The particles of Dicalite filteraid added to the raw liquor as "body-feed" travel with the liquor into the filter; there they are caught and held by the precoat or filtercake on the filter screens (together with the unwanted solids from the liquor) while the clarified liquor continues through.

This unretouched photograph of a section through an actual Dicalite filtercake shows the even dispersion of unwanted impurities throughout the cake and how easily the clean precoat peels from the screen or cloth. Inset shows surface magnified 75 times.

This continuously fresh filter face means that unwanted solids cannot mass together to blind the screen and halt the filtering action—a point of major importance in the case of slimy, sticky or gelatinous impurities. Instead, they are dispersed, distributed through the filtercake in such scattered fashion that the millions of microscopic channels through the filtercake remain open for maximum throughput combined with exceptionally "sharp" separation of solids.

No matter what your filtration problem, whether it be desired clarity or fast flowrate, it is very probable that it can be answered with one or another of the Dicalite family of filteraids . . . the finest in diatomaceous materials. For complete information, write to

1930 • 1955
25
YEARS

Dependable GLC GREAT LAKES Dicalite®
DIATOMACEOUS MATERIALS

DICALITE DIVISION: GREAT LAKES CARBON CORPORATION, 612 S. FLOWER ST., LOS ANGELES 17, CALIFORNIA

IMPORTANT NEW BULLETIN

describes space-saving, weight-saving

Century

Performance-Rated

MOTORS

1 to 30 H. P.

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1806 Pine Street, St. Louis 3, Mo.

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1806 Pine St., St. Louis 3, Mo. • *Offices and Stock Points in Principal Cities*

Now! Instruments count costs, too!

In any type of manufacturing operation—whether candy or cable . . . bread or boats . . . silk or steel—you find one universal language spoken. It's the language of *costs*—and it must be spoken fluently.

How much—in gallons, pounds, cubic feet, kilowatt hours, time—must be translated into how much in *dollars* to give you an accurate accounting of costs?

Instruments can answer the question for you, with accurate records of flow, level, downtime, weight.

A new dimension in instrumentation

Instruments are doing an amazing job in measuring and controlling numerous process *conditions*—temperature, pressure, flow, pH, liquid level, specific gravity, and many others.

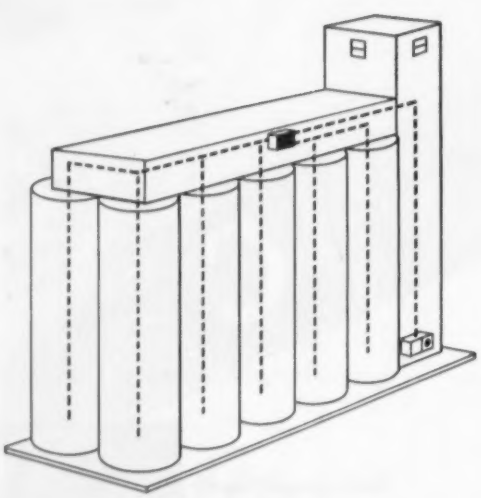
Instruments can do just as amazing a job in helping you measure process costs—automatically, faster, more accurately, and in a more penetrating way than ever before.

What kind of cost data can instruments collect?

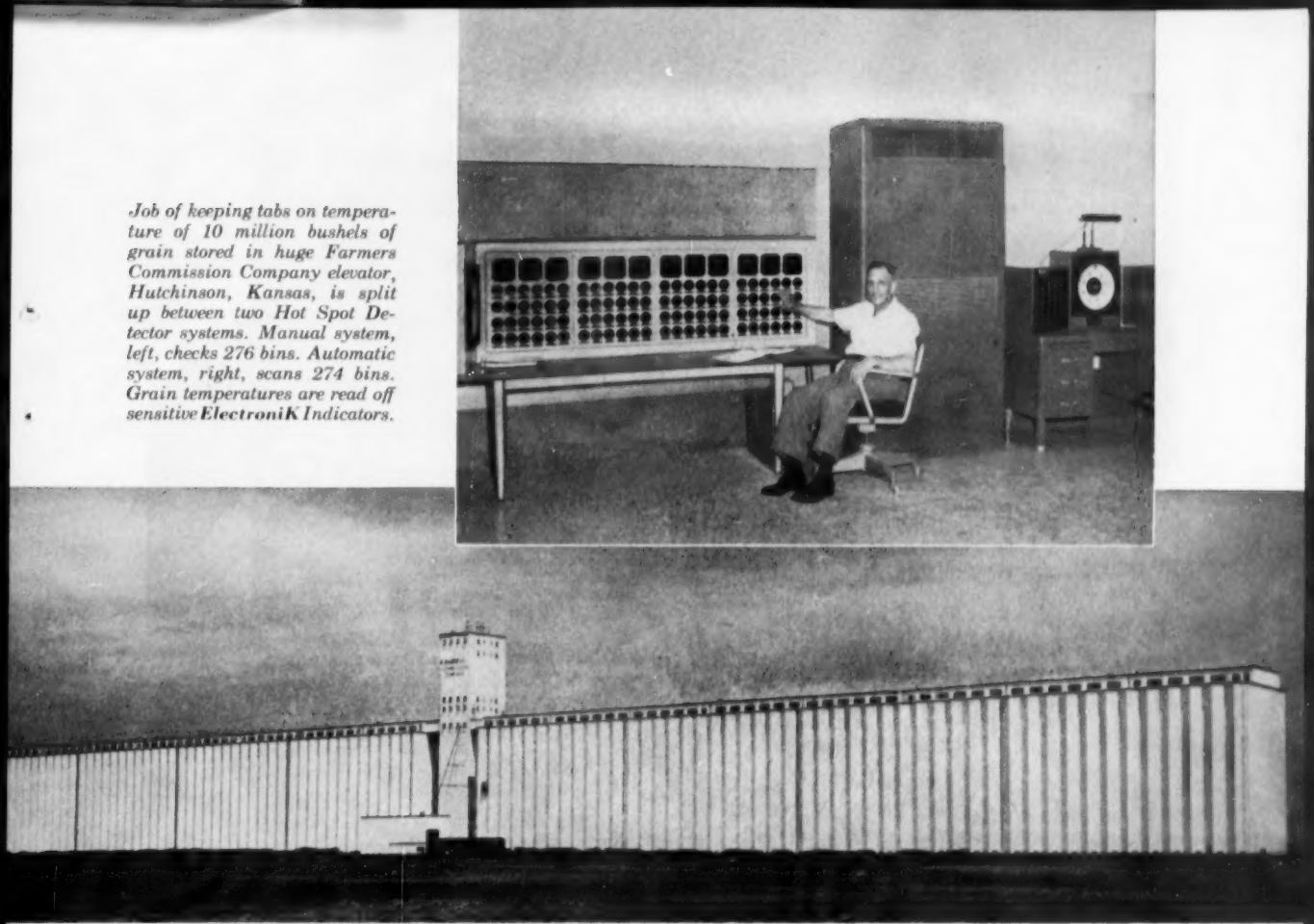
1. **Cost data related to flow of:** steam, water, gas, oil, chemicals, raw materials, intermediate products, finished products, by-products, wastes.
2. **Cost data related to levels of:** storage tanks, evaporators, vats, boiler drums.
3. **Cost data related to downtime of:** presses, production machinery, stills, boilers, dryers, pumps, compressors, other machines.
4. **Cost data related to weight of:** coal and other solid fuels, raw materials, intermediate products, finished products, by-products, wastes.
5. **Cost data related to the production and consumption of utilities.**

Your Honeywell sales engineer will be glad to fill you in on this important new field for instrumentation—instruments as an aid to cost accounting. Give him a call . . . he's as near as your phone.

Automatic temperature monitoring guards stored



Thermocouples spaced along suspended Nylon-covered sensing cable detect grain temperature at six-foot intervals in each of the 550 storage bins.



Job of keeping tabs on temperature of 10 million bushels of grain stored in huge Farmers Commission Company elevator, Hutchinson, Kansas, is split up between two Hot Spot Detector systems. Manual system, left, checks 276 bins. Automatic system, right, scans 274 bins. Grain temperatures are read off sensitive ElectroniK Indicators.

grain against spoilage

WHEN stored grain begins heating, it's a sure sign of trouble ahead. A rise in temperature, caused by insects, moisture pockets, dirt-chaff, or molds, signals the start of spoilage action.

With early warning of exactly when and where heat develops, however, operators can take immediate steps to protect their grain and guard against dollar loss. A dependable, foolproof system, developed and engineered by Hot Spot Detector, Inc., now senses the slightest rise in temperature anywhere in the grain and allows sufficient time to turn, fumigate, aerate, or dry the heating portions.

Heart of the Hot Spot Detector system is a sensitive *ElectroniK* Indicator which quickly signals temperature readings from thermocouples spaced at 3-, 6-, or 7-foot intervals throughout the stored grain. The Indicator, graduated from 0 to 150 F, has a big round dial which can be read as far away as 60 feet. Temperature readings are accurate to four-tenths of a degree. At various levels in every bin temperatures may be checked by means of manually switched controls . . . or scanned automatically, a thermocouple temperature report every four seconds.

In terminals, sub-terminals, country stations, and flat storage, the accurate Hot Spot Detector system protects grain against expensive spoilage, provides a valuable guide to plant operation, and reduces the cost of operating elevators. The *ElectroniK* Indicator may be installed in headhouse, gallery, or office . . . for most convenient, centralized regulation.

Here is one more outstanding example illustrating how versatile *ElectroniK* indicators, recorders, and controllers are contributing to more efficient, more automatic, and more economical operation in the food industry. Ask your nearby Honeywell sales engineer to discuss ways in which *ElectroniK* instruments can benefit you. Give him a call...he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters

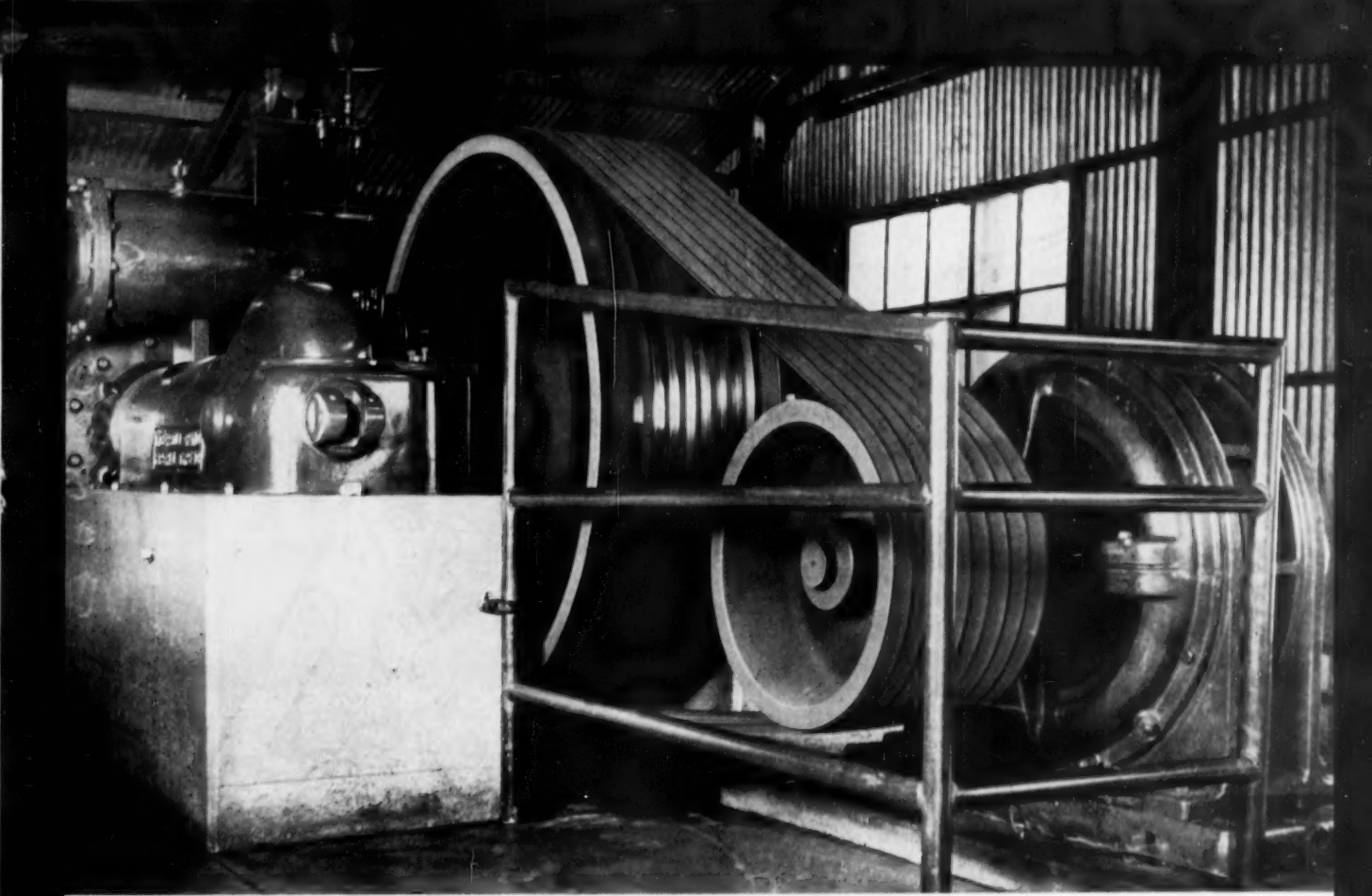
Here is Why!

You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

- No oil filters.
- No dust filters.
- No internal lubrication to contaminate air handled.
- No internal wearing parts.
- No valves, pistons, or vanes.
- Non-pulsating pressure.
- Original performance constant over a long pump life.
- Low maintenance cost.

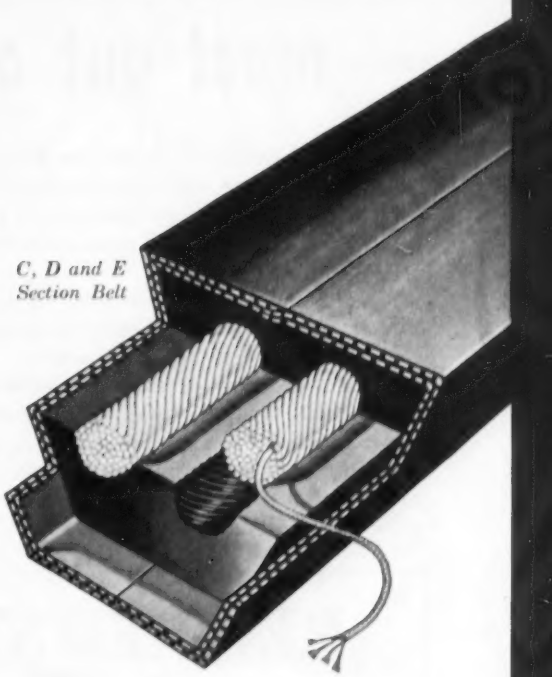
NASH ENGINEERING COMPANY
395 WILSON, SO. NORWALK, CONN.



Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every plant application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of any plant service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



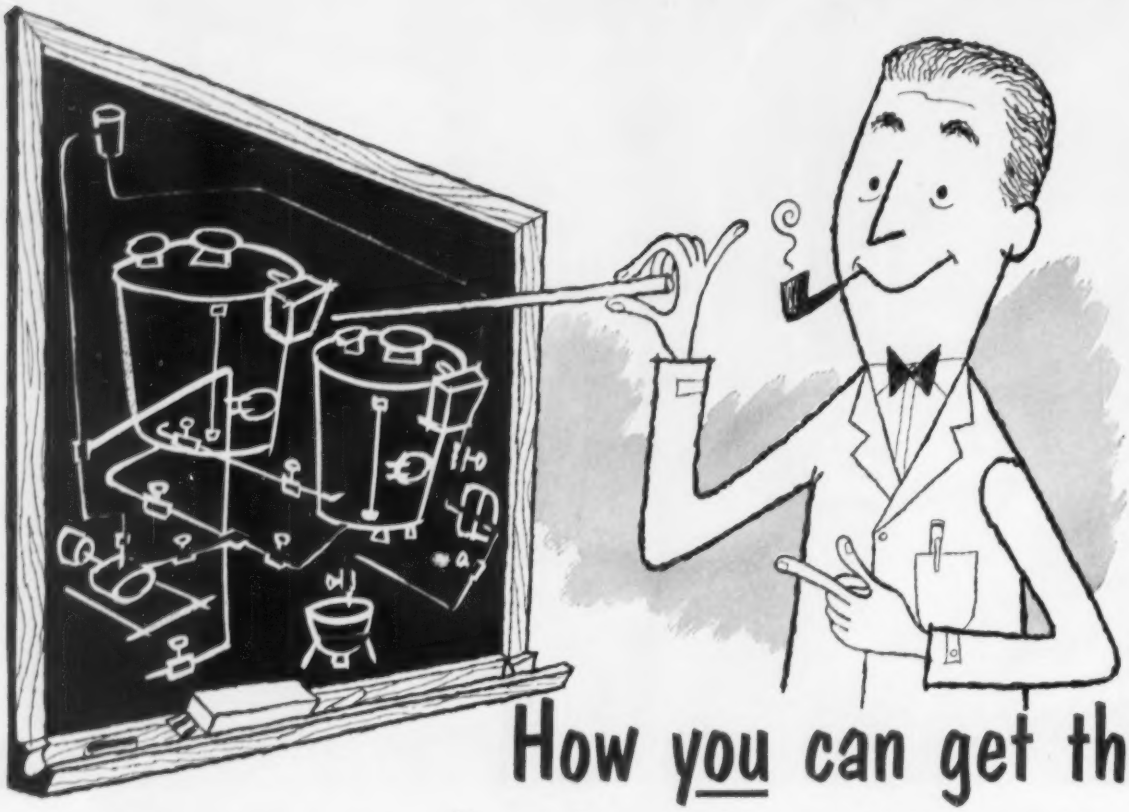
C, D and E Section Belt

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



How you can get the most out of a liquid sugar system

"These three hints," maintains your Flo-Sweet Engineer, "will help you get the most out of your liquid sugar system.

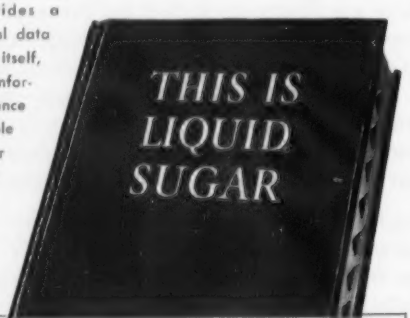
"First, make sure the system is designed by engineers who are experienced both in liquid sugar and in the technology of your food products.

"Second, have these engineers install the system.

"And third, use only top quality liquid sugar, blended accurately to your individual specifications.

"Here at Flo-Sweet we're in the habit of helping food manufacturers with all three of these important steps. In fact, that's our one and only business. If you aren't already enjoying the convenience . . . the sanitation . . . the cost-cutting and quality-improving advantages of a Flo-Sweet system — why not check with us today?"

"MUST" READING FOR EVERY SUGAR USER: This authoritative new manual contains over 200 pages of detailed information on the design, installation and operation of liquid sugar systems. It covers the use of liquid sugar in major food industries, provides a wealth of technical data on liquid sugar itself, and gives specific information on performance and costs. A valuable reference work for every food technologist's library. Price $5.00.



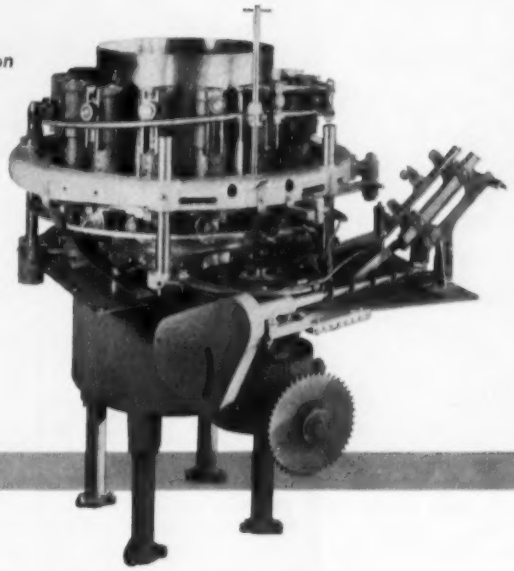
REFINED SYRUPS & SUGARS, Inc.

YONKERS, NEW YORK

FLO-SWEET
FIRST IN LIQUID SUGAR

SERVING INDUSTRIAL SUGAR USERS EXCLUSIVELY
FROM YONKERS—PITTSBURGH—TOLEDO—DETROIT

- ★ *H. J. Heinz Co.*
- ★ *Kingan & Co.*
- ★ *Beech Nut Packing Co.*
- ★ *Hershey Chocolate Corporation*
- ★ *White Rock Bottling Co.*
- ★ *Campbell Soup Co.*
- ★ *Libby's*
- ★ *Armour & Co.*
- ★ *Quaker Oats Co.*
- ★ *Minute Maid*
- ★ *Gerber's*
- ★ *Duffy-Mott Co.*
- ★ *Hawaiian Pineapple Co.*
- ★ *Borden Co.*
- ★ *Snow Crop*
- ★ *John Morrell & Co.*
- ★ *Swift & Co.*



TESTED and PROVED

by critical users . . . by time . . . by varied applications

Pfaudler Piston Fillers . . . cleanly handle up to 800 cans per minute (sometimes up to 1000, depending on product). There isn't a machine on the market that can match its over-all performance. Ask us to prove it.

Just look at the big names in the food packing business using Pfaudler Piston Fillers. They offer solid evidence of user satisfaction.

Then add the tests of time, and varied applications under all sorts of speed requirements. The record speaks for itself.

What you can gain by using Pfaudler Piston Fillers!

Basically Pfaudler Piston Fillers are "foolproof." Note the design of valves and pistons (Fig. 1). Very simple. Very precise. Accurate to within $\pm 1/10$ oz. Very easy to clean—no tools required to remove pistons or valves. You save time and money.

Spillage of product during filling is prevented by a no-can-no-fill device. Product waste is nil. Right at the start *you get a clean package.*

Adjustment of fill is made at one point, even while filler is running. *You save time, save product, keep up your production rate.*

Bearings and gears are automatically lubricated. Only three points on the filler are hand lubricated. So, because cleaning is simple, *maintenance is no problem.*

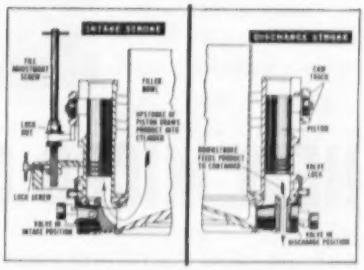


Fig. 1. These diagrams show position of operating parts of valve during intake and discharge strokes. Action is positive, volume of product precise.

If you are filling anything from liquids to semi-solids, it will certainly pay you to look over this line of fillers. To help you, we will be glad to send you our Booklet 911. The coupon is for your convenience.

THE PFAUDLER CO., Dept. FE-11, Rochester, N. Y.

Please send me Bulletin 911, "Rotary Piston Fillers."

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State____

THE PFAUDLER CO., ROCHESTER 3, N. Y.

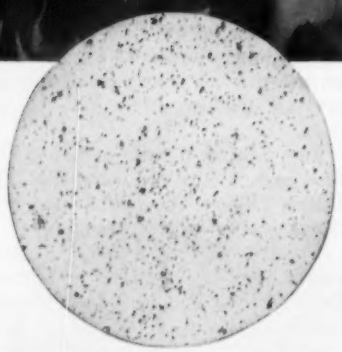
In the laboratory of Wm. J. Stange Co., a food technologist compares 50-A micro-ground Spice with ordinary ground spice under a microscope.

NEW MICRO-GROUND SPICES

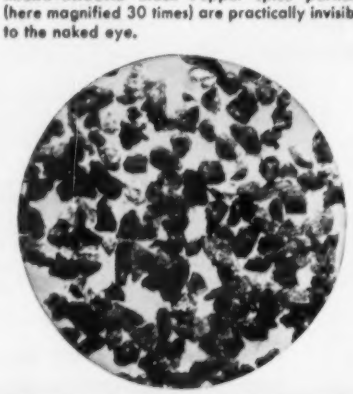
Although spices themselves haven't changed in a thousand years, unsuspected qualities have been discovered in them by a recently developed process called micro-grinding. Patented by Wm. J. Stange Co., this process consists of feeding whole natural spices into specially designed water-cooled roller mills which pulverize the spice into particles so minute, that only thru a microscope can you appreciate their size. Compared to ordinary grinding methods, the new process produces 50 to 100 times more particles of spice . . . millions more per pound.

The minute size and vast number of spice particles permit uniform and thorough distribution throughout each batch of food product, eliminating specking or the formation of hot spots.

Most important, however, is the standardization of flavor made possible by this unique process. This, in addition to the total utilization of flavor from the spices themselves makes this new spice one of the really important developments in the food processing industry.



MICRO-GROUND Black Pepper spice particles (here magnified 30 times) are practically invisible to the naked eye.



ORDINARY ground (50 mesh) black pepper particles (also magnified 30 times) appears as huge boulders by comparison with micro-ground spice.

STANGE

Announces New

50-A®

spices

Natural Whole Spice Ground to Microscopic Fineness!

Only 50-A micro-ground spices . . . originated by Stange . . . give you the true flavor of ground spices PLUS controlled uniformity, together with the following completely new characteristics—

- **All the flavor and color of natural spice without the specks**
- **More uniform distribution**
- **Maximum availability of flavor**
- **Constant control of flavor intensity**
- **Maximum retention of flavor**
- **Constant spice levels during shelf life**
- **Easy to use, powder form. Available in 50 to 250 pound bulk containers, or in exact-weight, batch size packages.**
- **Available in individual spices or complete seasoning blends**

For complete details on applying new Micro-Ground 50-A Spices to your fine foods, write, wire or phone—

Wm. J. Stange

"SILENT PARTNERS IN FAMOUS FOODS"®

Chicago 12, Illinois Oakland 21, Calif.

Stange-Pemberton Ltd., New Toronto, Ontario

View of battery of special roller mill equipment processing natural spice into 50-A Micro-ground Spice. The large steel rollers, between which the spice is ground, are perfectly smooth and turn at differential speeds to cause a shearing action between the smooth surfaces. Rollers are water-cooled internally to maintain the spice at a low temperature and to prevent loss of volatile flavors.

MICRO-GROUND SPICE..... .....ORIGINATED BY STANGE

Wm. J. Stange Co. who last year celebrated its 50th anniversary, spent more than two years perfecting the micro-grinding process. Sold under the copyrighted name of 50-A Spice, these new seasonings are fully protected by patents and supplied to the food industry by Stange exclusively.

Not only are individual spices: pepper, nutmeg, cinnamon, etc. available in micro-ground form but in combination with soluble C.O.S. (Cream of Spice) Seasonings. These special blends are called Micro-Cream. By combining the two types of spices, 50-A and C.O.S., Stange can now produce seasoning blends utilizing the special advantages of each to achieve the most satisfactory flavor, color and solubility in the finished product. Micro-Cream spice blends, too, are flavor controlled to insure uniformity.

STANGE'S EXPERIMENTAL KITCHENS, laboratories and technical staff are available to develop special seasoning blends, or assist you in creation of new products.

YOU CAN DEPEND ON THE Richardson E-50!

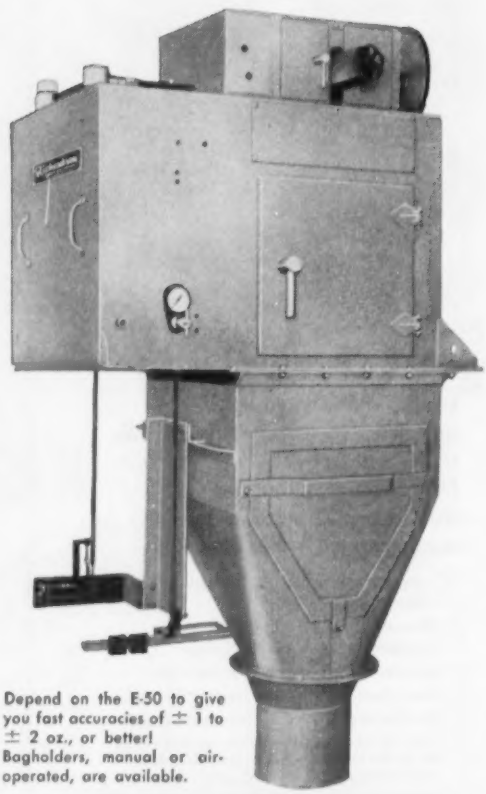
When the weighing is fast and the materials are loose (or even sluggish!), and you're having a running battle with profit loss from weight inaccuracy or the high cost of bagging and scale upkeep . . .

here's one scale that won't let you—or your profits—down!

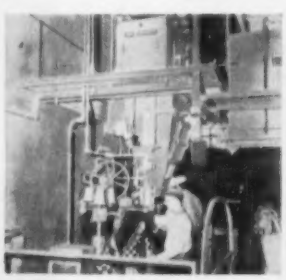
IT'S DEPENDABLE! The E-50's work-horse dependability makes it the perfect choice for any plant *where output vitally depends on the perfection of the bagging scale.* And upkeep is low! You'll find Richardson Scales still in operation after 30 and more years of service.

IT'S FAST, ACCURATE! With the rugged, completely automatic Richardson E-50 you'll get high speed bagging with accuracies *that never before were a practical possibility*—up to 1/10 of 1% under optimum conditions.

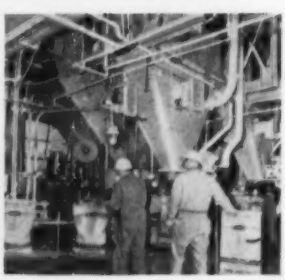
IT'S VERSATILE! Unique design permits the weighing of hundreds of food, chemical, grain and other materials. The E-50 is equally efficient as an independent bagging machine, or as an integral part of a co-ordinated production line packaging system. Don't let weight inaccuracy and bagging costs pick your pockets. Find out about the scale that really unties production tie-ups—Richardson E-50. Write today for free illustrated bulletin #3749A that tells the whole cost-saving E-50 story!



Depend on the E-50 to give you fast accuracies of ± 1 to ± 2 oz., or better! Bagholders, manual or air-operated, are available.



Duplex Model E-50 bags poultry mash up to twenty-two 50-lb. bags per min. at leading feed mill.



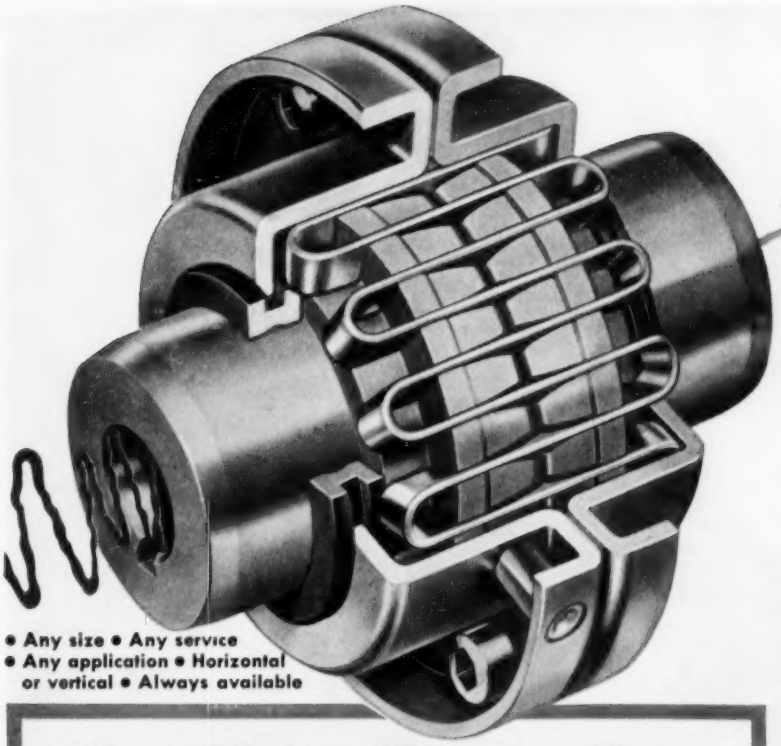
Ten 50-lb. bags per min. of antibiotic are delivered from Duplex E-50 in major pharmaceutical plant.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY • Clifton, New Jersey

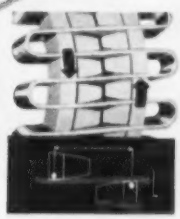
Atlanta • Boston • Buffalo • Chicago • Cincinnati • Detroit • Houston
Memphis • Minneapolis • New York • Omaha • Philadelphia
Pittsburgh • San Francisco • Wichita • Montreal • Toronto • Havana
Mexico City • San Juan



• Any size • Any service
• Any application • Horizontal or vertical • Always available

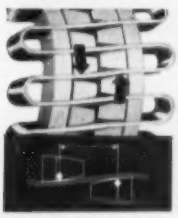
Exclusive FALK Steelflex grid-groove design smothers shock and vibration.

The damaging effects of shock and vibration can shorten the life of any connected machinery. Here is how the Steelflex grid-groove design overcomes these common enemies.



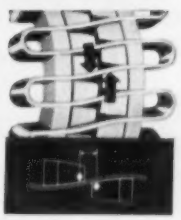
Under LIGHT LOADS

The gridmember bears only at outer edges of grooves. The long span between points of contact remains free to flex under load variations.



Under NORMAL LOADS

As load increases, the distance between supports on the grooves is shortened proportionately, but a free span remains to cushion shock loads.



Under SHOCK LOADS

Under extreme overloads, the grid-member bears fully on the grooves and transmits full load directly. The coupling remains flexible, within its rated capacity.

Why FALK Steelflex Couplings give the *finest* protection for connected machinery

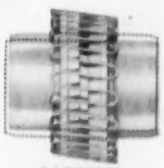
Maximum protection of connected machinery is best provided by Falk Steelflex Couplings because, thanks to their exclusive design, they overcome the damaging conditions of shock loads, shaft misalignment and vibration. How this unique multiple protection is made possible is shown at the right.

Falk Steelflex Couplings give the most economical protection, too, because they make connected machinery last longer and give better service. Furthermore, when actual coupling costs are figured per year of service, Falk Steelflex Couplings show substantial savings through their rugged all-steel construction, easy interchangeability and low maintenance requirements.

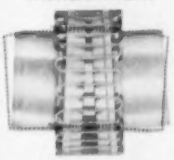
The basic Type F Steelflex Coupling—in 33 sizes to cover capacities from 2/5 through 70,000 hp per 100 rpm—meets over 90% of all industrial applications. Special or Dual Purpose Steelflex Couplings are available for problem applications. Write to Department 247 for engineering bulletin, including selection and dimension details.

...Accommodates shaft misalignment and free end float

Basic maintenance procedure dictates regular inspection and correction of shaft alignment. Between inspections, Steelflex couplings provide protection by accommodating unavoidable shaft misalignment and end float. The gridmember which connects the two hubs of a Steelflex coupling is not fastened to either hub, so each hub can shift without imposing load on the other shaft.



PARALLEL MISALIGNMENT



ANGULAR MISALIGNMENT

FREE END FLOAT

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

• Motoreducers	• High Speed Drives	• Marine Drives
• Speed Reducers	• Special Gear Drives	• Steel Castings
• Flexible Couplings	• Single Helical Gears	• Weldments
• Shaft Mounted Drives	• Herringbone Gears	• Contract Machining

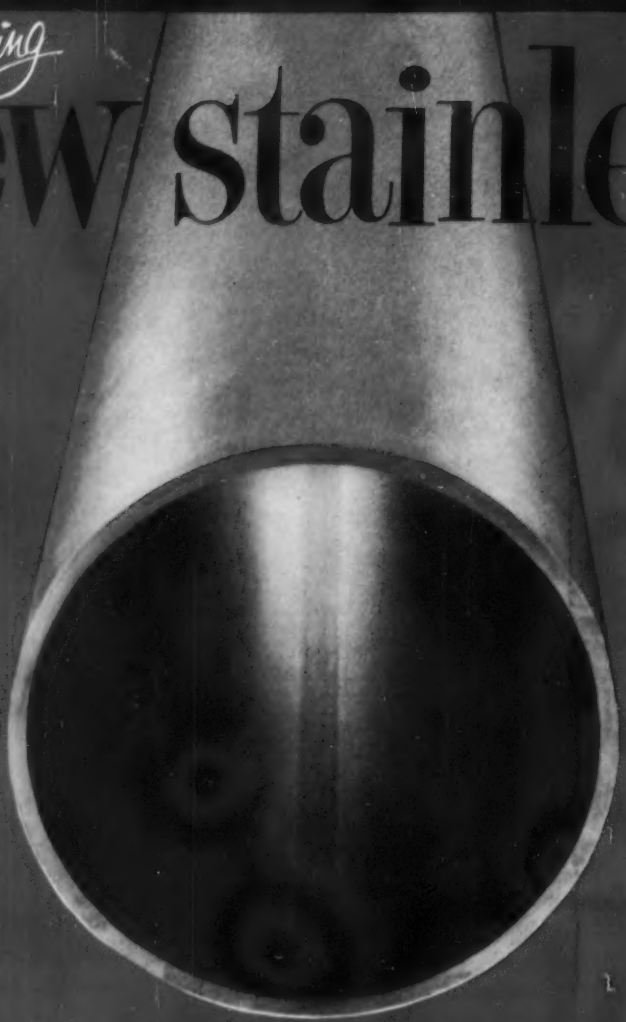
FALK

...a good name in industry

For more data, circle this page number on card at back →

announcing

new stainless



Photograph of Contour Welded 3" IPS Schedule 10 pipe Type 304

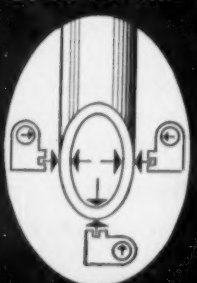
CONTOUR-WELD PIPE . . . BEST BY ANY TEST YOU CAN NAME

Reverse Bend
(2⅜" O.D. x .154 wall)

Flare and Flange

Flattening

Pressure (Tubing)



Uniformity

welded pipe

. . . with smooth inside surface free from bead or undercut . . .

Now you can get any gage TRENTWELD stainless pipe or tubing with a smoother inside surface than ever before – free from any undercut or projecting bead. Here's why . . .

With their new, patented, *Contour-Weld** process, Trent puts gravity to work. Molten metal in the weld zone is always pulled down by gravity – but, in *Contour-Welding*, the weld's at the bottom. As molten metal is pulled downward . . . held together by surface tension . . . it forms itself into the inner contour of the pipe, rather than taking the opposite curvature as happens when welding is done at the top.

What Contour-Weld means to You

Because Trent has always used uniformly rolled stainless strip, Trent pipe and tubing have long been known for extremely high uniformity both of wall thickness and curvature. *Contour-Welding* extends that uniformity to the weld zone itself. There's no projecting weld bead . . . no undercut. Flanged or flared ends are smoother, too . . . cavitation corrosion or erosion are completely eliminated. By every test, Trent *Contour-Welded* pipe outperforms any other pipe or tubing.

Test this exclusive new TRENTWELD stainless pipe or tubing yourself. You'll find it's ideal for any application, including such demanding ones as high pressure hydraulic lines . . . lines carrying corrosive chemicals . . . high-velocity systems. And use *Contour-Welded* pipe and tubing with confidence, for it's made by Trent – tube mill specialists.

Why Trent's Exclusive* Contour-Weld *Process means smoother welds . . .

Here's the conventional way of welding pipe. Gravity pulls some of the molten metal down into the pipe to form a bead that is extremely difficult to remove by cold working. The cold working of the inside bead can lead to undercuts, focal points for erosive and corrosive attack. Cleaning is difficult.

Trent couldn't repeal gravity, so they put gravity to work. They flopped the pipe over, and made the weld at the bottom. Gravity still pulls the molten metal down – but, in doing so, it simply makes the weld bead contour correspond to the contour of the pipe itself. That's why there's no telltale bulge of weld metal on the critical inside pipe surface. And, even on the outside surface, the weld-bead contour more closely approaches that of the parent metal than any other welded pipe.

*Contour-Weld is the trade mark of the Trent Tube Co. for its process of welding pipe and tubing which is protected under U.S. Patent 2,716,692.

TRENTWELD **STAINLESS STEEL TUBING**

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)

FLAVOR-GRAM

CAPSULED RESEARCH FACTS

THAT SHOW HOW AC'CENT CAN CREATE CONSUMER PREFERENCE FOR YOUR PRODUCTS

Everyone realizes the value of flavor in building acceptance and sales for food products. Modern canning and quick freezing have taken great steps toward capturing this elusive but important characteristic.

AC'CENT, *pure* monosodium glutamate, adds further improvement. It is the only ingredient that *builds* and *holds* natural flavors in a wide variety of foods, *without* adding a flavor of its own.

The fresher the food, the greater the glutamate content. This diminishes rapidly prior to and during processing. AC'CENT *builds* flavor by restoring the natural glutamate content to its original level.

And because AC'CENT is stable, it *holds* these natural flavors through freezing, canning, storing. In fact, AC'CENT literally "keeps foods young."

GOOD NEWS FOR SPINACH PROCESSORS. Both spinach processors and eaters will be glad to learn that Ac'cent rids spinach of its rough, "edgy" effect on the teeth, and at the same time enhances its natural flavor.

The secret: roughness results from deposits of insoluble compounds, called oxalates, found in spinach. Ac'cent, pure monosodium glutamate, added during processing, makes these oxalates soluble so they don't collect on the teeth.

By overcoming this undesirable characteristic – plus enhancing the flavor as no other seasoning can – Ac'cent raises spinach to an even higher level of consumer acceptance.

PRECISION DISPENSER FOR LIQUIDS. Frozen-food processors now have a fast, accurate method for adding Ac'cent to moving containers. A new dispensing mechanism, developed by Ac'cent research, applies monosodium glutamate to foods – before freezing – at a rate up to 400 cartons a minute.

Other advantages: economical and efficient automatic operation; uniform control; no drip loss. This new liquid dispenser is versatile. It can be adapted for all canning processes.

NEW FLAVOR FOR VEGETABLES. A new method of judging the quality of vegetables has been developed by Ac'cent research. It involves the determination of the glutamate content of a given food.

The fresh flavor of a particular young, perishable vegetable is relative to the amount of glutamate present. This glutamate diminishes after the vegetable reaches optimum maturity for consumption. It is also lost after harvesting and prior to processing. Hence, an accurate measure of glutamate content is an index of the quality and may supply a processor with a reason as to why this brand outsells or undersells his competition.

This new method measures the glutamate content of vegetables quickly and conveniently. It gives the processor a useful tool in maintaining highest product standards.

Literature and detailed information about any of the items mentioned above are available on request. Just drop us a line on your letterhead.

Ac'cent®

BRAND

PURE MONOSODIUM GLUTAMATE

FLAVOR MAKES SALES . . .
AC'CENT BUILDS NATURAL FOOD FLAVOR

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Here's How

you can lower the cost of elevating

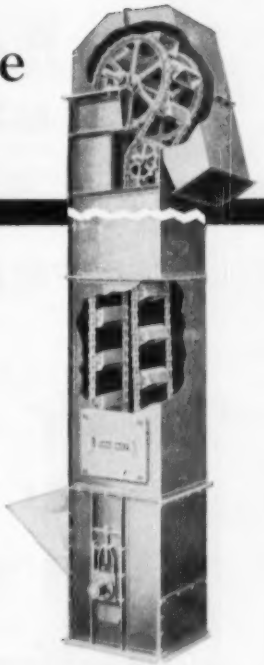
LINK-BELT will recommend the right bucket elevator from 13 types in 4 basic designs

YES, not only does Link-Belt make bucket elevators for all types of material — there is specialization right down to spacing of buckets . . . the types of take-ups and hoods for utmost effectiveness. In addition, Link-Belt offers a wide range of buckets for further assurance of maximum efficiency in handling your materials.

Installation, maintenance and operating costs are low with Link-Belt Bucket Elevators. Rigid, jig-built casings are self-supporting requiring only occasional lateral tie-ins depending on height. You have quick access to both head and boot for periodic inspections. Simple screw or gravity take-ups maintain chain or belt tension always.

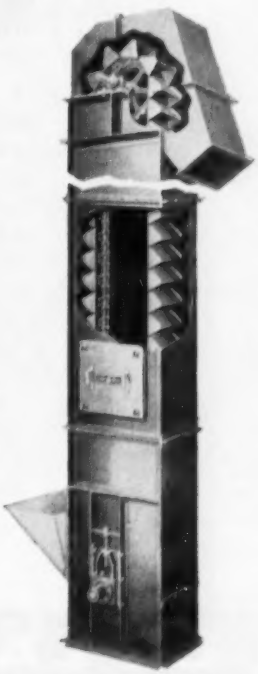
To be sure of a bucket elevator system tailored correctly for your needs, include Link-Belt in the designing of your next plant. Get in touch with a materials handling expert through your nearest Link-Belt office.

Link-Belt 75-ft. high bucket elevator lifts material from truck dump hopper to storage bin via screw conveyor. Casings need only occasional tie-ins depending on height.



Positive discharge for light, fluffy and fragile materials or materials that have a tendency to stick to the buckets.

Centrifugal discharge for free-flowing, fine or loose materials with small to medium lumps.



Continuous discharge for range of materials — light to heavy, small to large, abrasive lumps.

Internal discharge for gentle handling of small articles such as pellets, seeds, castings.

LINK-BELT

BUCKET ELEVATORS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13.700

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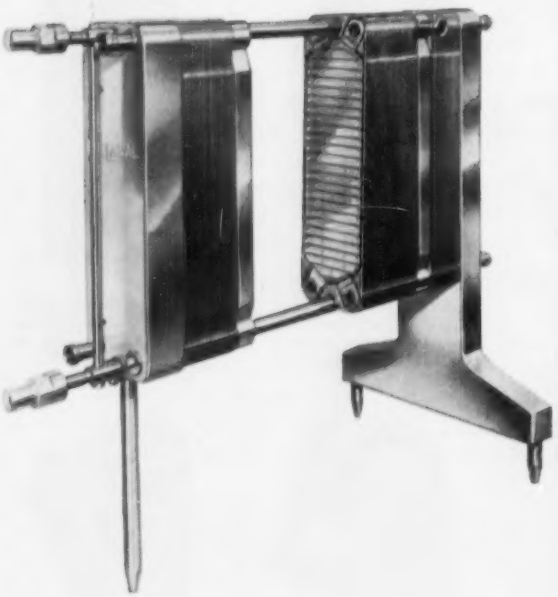
ONLY
DE LAVAL
PLATE HEAT EXCHANGERS
GIVE YOU
ALL THESE FEATURES!...



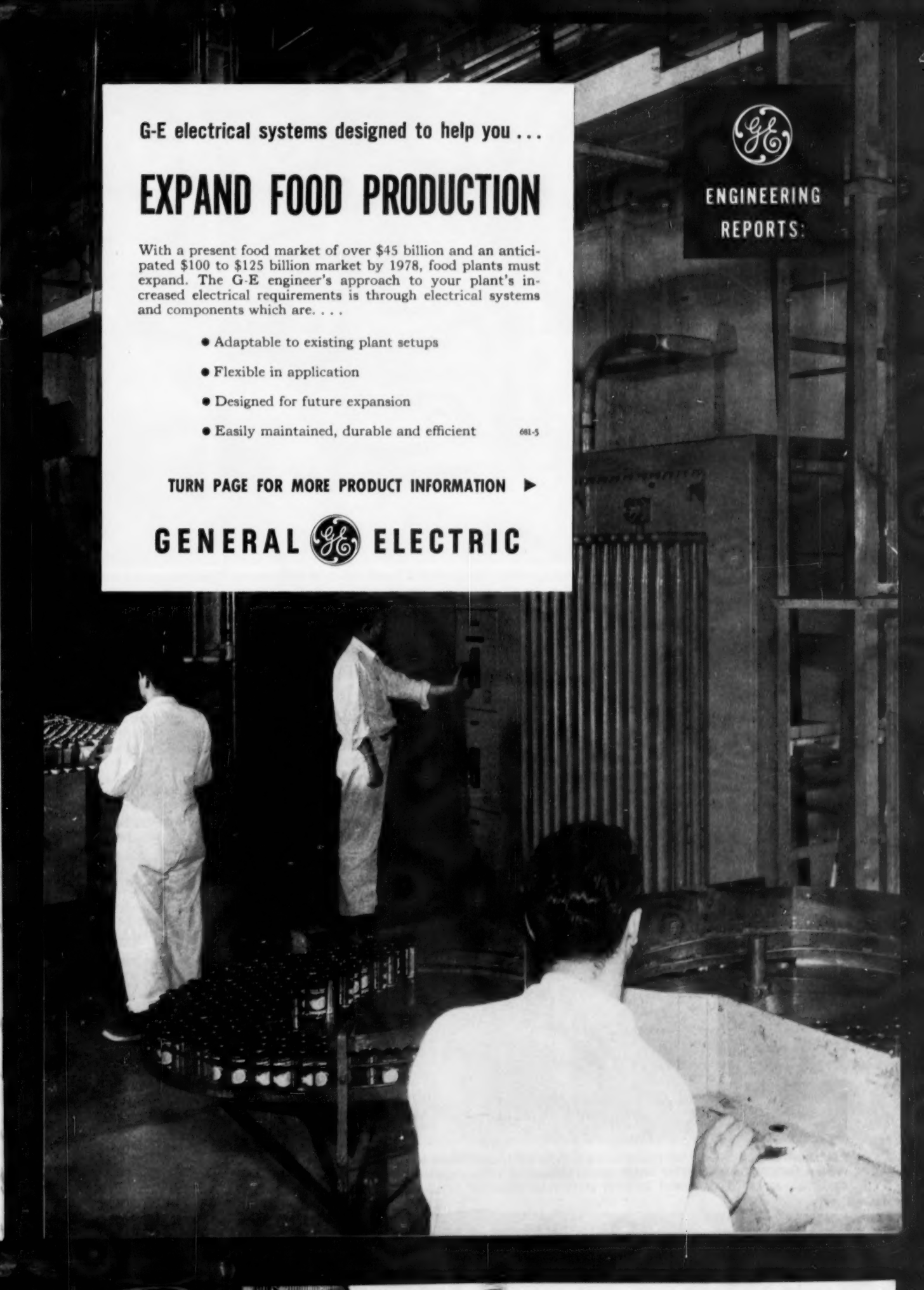
When the new De Laval Plate Heat Exchangers were first exposed at the shows . . . their design and *multiple* features attracted wide and enthusiastic comment. Now . . . installations give further proof that the industry believes them outstanding. Before you put in any Plate Heat Exchanger . . . check these features yourself and you'll order De Laval!

- ▲ High coefficient of heat transfer . . .
- ▲ Ability to withstand high pressure . . .
- ▲ Easy and positive assembly and disassembly . . .
- ▲ Precision tightening . . .
- ▲ Replaceable gaskets . . .
- ▲ Easy cleaning . . . by back flushing or hand washing . . .
- ▲ Easy inspection of interior surfaces . . .
- ▲ Flexibility to meet changed operating conditions . . .
- ▲ Highest quality instrumentation for precise control . . .
- ▲ AND strength and precision construction for long, trouble-free life.

Want *all* the details? Write for De Laval Plate Heat Exchanger Bulletin.

DE LAVAL
plate heat exchangers

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.



G-E electrical systems designed to help you . . .

EXPAND FOOD PRODUCTION

With a present food market of over $45 billion and an anticipated $100 to $125 billion market by 1978, food plants must expand. The G-E engineer's approach to your plant's increased electrical requirements is through electrical systems and components which are. . . .

- Adaptable to existing plant setups
- Flexible in application
- Designed for future expansion
- Easily maintained, durable and efficient 681-5

TURN PAGE FOR MORE PRODUCT INFORMATION ▶

GENERAL ELECTRIC

ENGINEERING REPORTS:

SEVERAL AVAILABLE TYPES of protective enclosures make G-E motors ideal for all indoor or outdoor uses. New Polyex insulation

G-E ENGINEERED DRIVES AND POWER SYSTEMS MEAN . . .

Modern, more flexible processing lines

IN THE NEXT TEN YEARS, production must increase an estimated 50% to meet greater consumer needs. Available manpower will increase only an estimated 14% during the same period.

INCREASED OUTPUT AND EFFICIENCY must close the production gap between available manpower and estimated demand. General Electric electrical systems are designed and installed for efficient, flexible, easily expanded production.

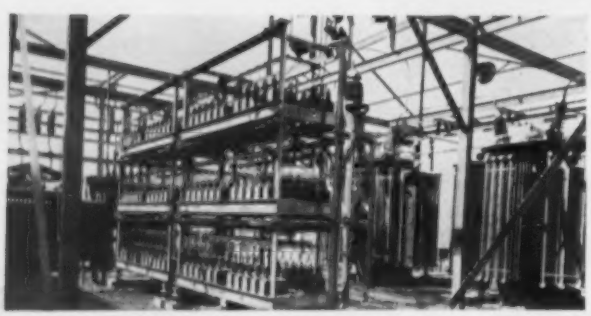
G-E ENGINEERING SERVICES (see back page) can help you meet production requirements to bring your electrical system up to date. The result is a modern system integrated into your present plant setup.

FOR ADDITIONAL INFORMATION on how G-E engineered systems and engineering services can help you, contact your G-E Apparatus Sales Representative during your early planning at the nearest G-E Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y.

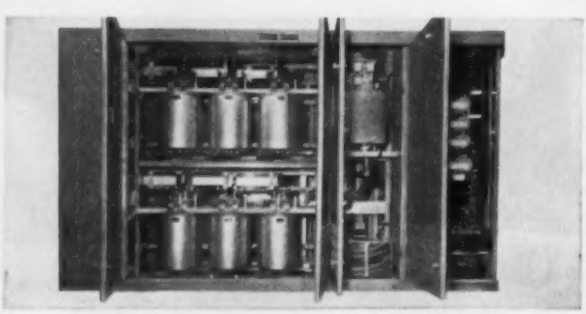
681-5

Engineered Electrical Systems for Process Industries

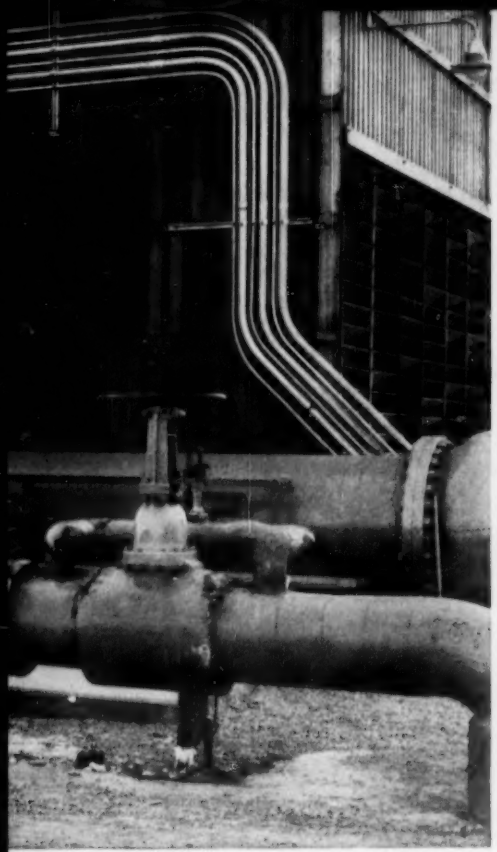
GENERAL ELECTRIC



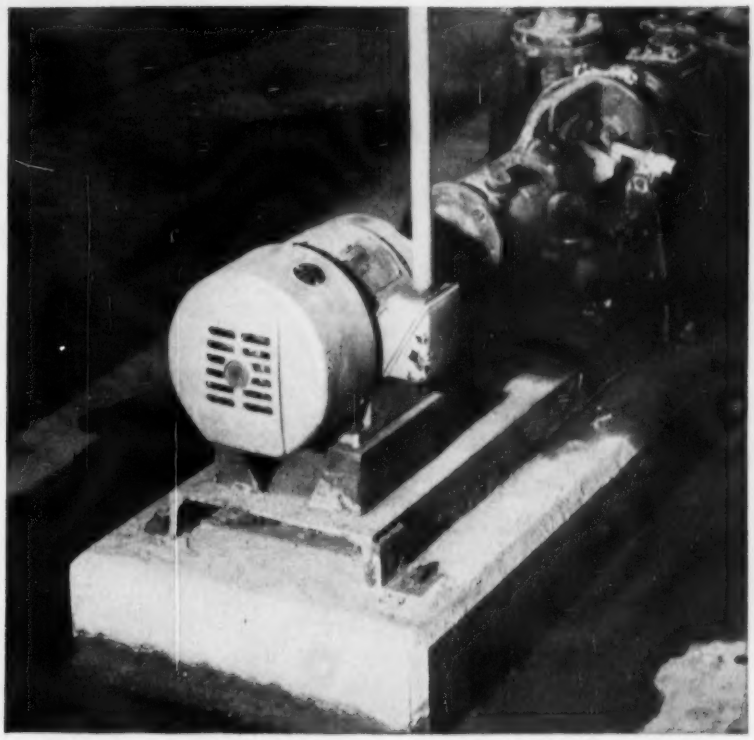
"BUILDING-BLOCK" design of this stack-rack capacitor block reduces installation costs. This design means equipment may easily be expanded or moved to meet plant requirements.



HIGH EFFICIENCY and low installation cost of this pumpless rectifier provide more reliable and economical d-c power. Factory wired, the unit is ready when it arrives to connect and operate.



gives up to 50% longer motor life.



NEW G-E TRI-CLAD* '55' MOTORS, totally enclosed, are suitable for damp areas, even where hosing is necessary. New cooling system cleans while it cools motor.

for your plant

G-E MAGNETIC STARTERS and safety switches are compact, for maximum space savings. Short-circuit protection is provided by circuit breaker or fusible disconnect switch.

CORROSIVE ATMOSPHERE effects are greatly minimized in these G-E Tri-Clad induction motors. Rugged cast-iron construction makes them excellent for process application.

SHORT CIRCUIT PROTECTION up to 60,000 amps, plus 50% greater space savings are provided by all-new G-E Limitamp*.

*Reg. Trademark of General Electric Company

SIX G-E ENGINEERING SERVICES . . .

HELP YOU PROTECT YOUR EQUIPMENT INVESTMENT

1 **G-E APPLICATION ENGINEERING** helps you and your consultants design the right electric system for your plant.

2 **G-E ANALYTICAL ENGINEERING** helps attain the optimum electrical system for your application. Engineering experience backed up by electronic system analyzers save valuable design time.

3 **G-E PRODUCT DEVELOPMENT** laboratories design and test new equipment under tomorrow's conditions to meet your future demands.

4 **G-E FIELD-SERVICE ENGINEERING** helps you supervise installation, expedite start-up of your major electric equipment.

5 **G-E MAINTENANCE SERVICE** from 36 G-E Service Shops will repair and uprate your old equipment, help establish productive maintenance of your equipment, furnish emergency service.

6 **G-E PROJECT CO-ORDINATION** means on-time engineering, shipment, installation of your electric equipment from preliminary diagrams through start-up.

These valuable services are available to you with General Electric equipment. Contact any General Electric Apparatus Sales Office. Meanwhile, for the full story of G-E engineering services, write for brochure GED-2244, General Electric Co., Section 681-5, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

If you use MILK or

N.F.D.M.S.

...see how

Sweet Dairy Whey

can improve quality
and reduce costs TOO!

SWEET DAIRY WHEY is an improved dairy ingredient that perfects the richness of "old-fashioned flavor" in modern food preparations. It improves color, texture, shelf-life and appearance of food products. And it can save you money too — up to 50% of your dairy ingredient costs — by replacing part or all of your present dairy solids.

If you use milk, or nonfat milk products, it will pay you to investigate Sweet Dairy Whey. It's spray dried, meets or exceeds U. S. Extra Grade standard. In addition to extensive use in the baking and meat industries, here are just a few of the ways Sweet Dairy Whey is being used to improve food products today:

Sherbet — for better control over texture, appearance, flavor. Reduces flavoring costs, too.

Candy — Sweet Dairy Whey preserves natural fresh flavor, texture and sweetness longer . . . provides superior eating qualities.

Cream-style foods — for smoother heavy-bodied cream soups and sauces with natural flavor. Improved reconstituting qualities.

Tomato soups — for greater heat stability, more original tomato taste and no separation before or after sterilization.

Prepared mixes and batters — for richer, golden-brown color, appealing milk flavor, and for tender, fluffy texture.

Soft drinks — for improving body characteristics in fruit juice type drinks . . . helps achieve proper "cloudiness" effect.

Pound for Pound Sweet Dairy Whey is Better!

Compared with milk or nonfat milk solids, Sweet Dairy Whey has:

- 50% more lactose (milk sugar) for natural flavor, dairy richness, color appeal, and tenderness.
- 50% more milk albumin to keep food tender, moist, fresh — longer.
- 25-50% lower cost . . . plus more of the essential milk constituents, more milk minerals and B-complex vitamins. And it's casein free!
- Uniform quality the year around. Prompt delivery.

Write Technical Service Department for additional information and working samples

Sweet Dairy Whey

A "VALLEY FRESH" PRODUCT

WESTERN CONDENSING COMPANY
APPLETON, WISCONSIN
World's Largest Producer of Whey Products

32 plants coast-to-coast

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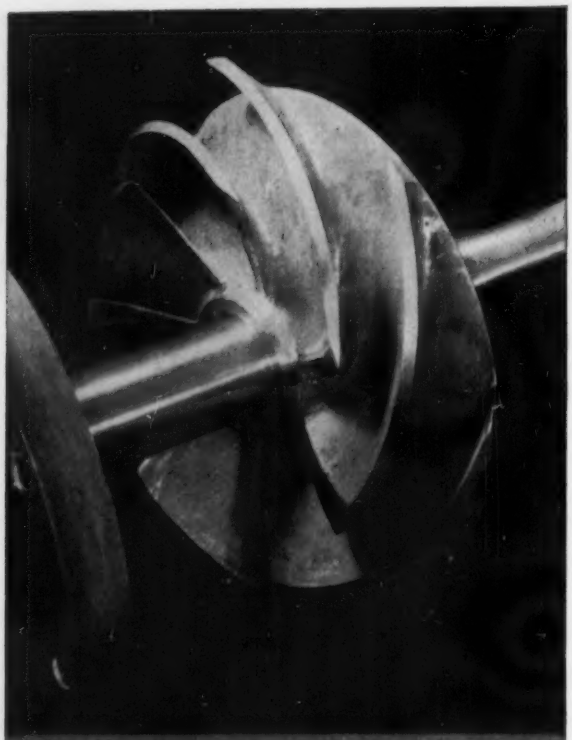
"We need BIG Stainless Castings"



"Our Stainless Castings are Special"

"BIG"–"SPECIAL"–"TINY"–"INTRICATE"...

We can handle any job you have

Write for your copy: "ALLEGHENY METAL CASTINGS"

32 pages of valuable and complete data on stainless castings: analyses, properties, technical data on handling and heat treatment, typical applications, how to order, etc.

ADDRESS DEPT. FE-71

Our Buffalo Foundry produces high-alloy steel castings *exclusively* . . . principally for corrosion and heat resisting applications. We've had long and valuable experience (as a pioneer in both vertical-centrifugal and static stainless casting methods) with practically every type of service condition you can name, and we'll welcome the opportunity to take on any stainless, high-temperature or high-strength casting problems you have.

And not just as a matter of meeting the service conditions, either. We're ready to handle any special shape or difficult-to-cast section your job may require . . . and any size of casting from a few ounces to several tons.

● *Let us quote on your requirements.* You'll find Allegheny Metal castings unsurpassed for soundness, clean-grained strength and easy machining qualities. Uniform, too, and reliable in supply. *Allegheny Ludlum Steel Corporation, Henry W. Oliver Building, Pittsburgh 22, Pennsylvania.*

You can make it **BETTER** with

Allegheny Metal

AL® TIME-TESTED STAINLESS STEEL

WAD 5004 **Warehouse stocks carried by all Ryerson Steel plants**

Production goes on in the plant while

GUSTIN gb BACON SNAP*ON goes on the pipe....

This new and better way to insulate pipe saves valuable production time. Maintenance work or new installations can be completed faster. The photograph shows how a large manufacturer took full advantage of the one piece sections that were snapped on the overhead piping quickly, while work went on without fuss or muss in the plant below.

Ease of installation is just one reason why you should use Snap*On. The thermal efficiency of this new covering is the highest found in any pipe insulation, and because it is made of fine glass fibers it is tough and resilient. There is no breakage and virtually no mess to clean up when the job is done. It does not shrink, so the costly, time consuming job of pointing up opened joints is eliminated.

Your company is in the best of company when you use Snap*On, for a list of Snap*On users reads like "Who's Who in Industry". So don't put it off—put Snap*On on the very next time you insulate chilled or heated piping where temperatures do not exceed 350° F. The first step is to write for samples and our new brochure that contains complete technical data. Write today.

GUSTIN-BACON
Manufacturing Company

Thermal and acoustical glass fiber insulations
Pipe couplings and fittings • Railroad gaskets and supplies
272 W. 10th St., Kansas City, Mo.

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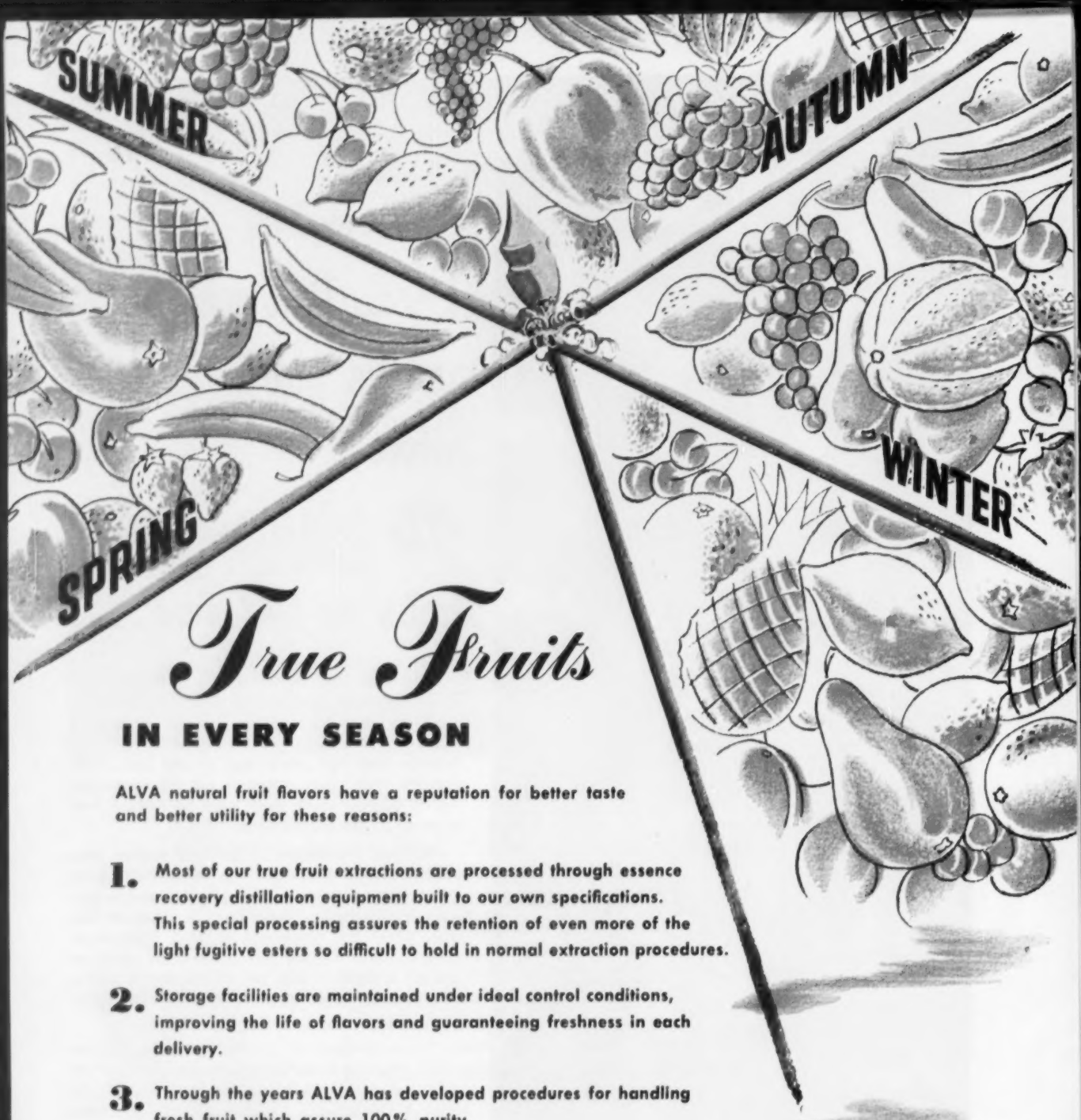


True Fruits

IN EVERY SEASON

ALVA natural fruit flavors have a reputation for better taste and better utility for these reasons:

1. Most of our true fruit extractions are processed through essence recovery distillation equipment built to our own specifications. This special processing assures the retention of even more of the light fugitive esters so difficult to hold in normal extraction procedures.

2. Storage facilities are maintained under ideal control conditions, improving the life of flavors and guaranteeing freshness in each delivery.

3. Through the years ALVA has developed procedures for handling fresh fruit which assure 100% purity.

ALVA true fruit flavors are ideal for every use, and the ALVA laboratories are eager to help with recommendations and samples for every true fruit problem.

VAN AMERINGEN-HAEBLER, INC.

521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva

FLAVORS

TRAY RACKS for transporting an exact freezer loading of packaged food were designed to fit snugly in recess between open freezer doors so as to line up space between freezer plates and tray rack guides. Freezer attendant more easily feeds from rack to freezer—90 packages on three trays in one operation.

These *Time-Motion* Line Changes Profit Management, Labor Alike

Analyzing "by move and minute," Seabrook found way to multiply capacity without taking more space. And into the bargain, productivity has jumped 300%, while tasks of the workers are easier and their incentive pay is up

W. J. SCHEFFER
Plant Manager, Seabrook Farms Co., Seabrook, N. J.

Results of time-studies practically applied in foresighted industrial engineering, are running up gains at Seabrook Farms Co., Seabrook, N. J., that include a wealth of both tangible and intangible dividends.

These are only five of the values won—

1. Production more than doubled, with no increase in working area.

2. Working picture improved, with operators now on the incentive system and materially increasing their incomes.

3. Freezer-line labor turnover, formerly high, now cut down to "negligible."

4. Greater protection of product quality attained.

5. Cost of empty-case handling slashed some $15,000 per year.

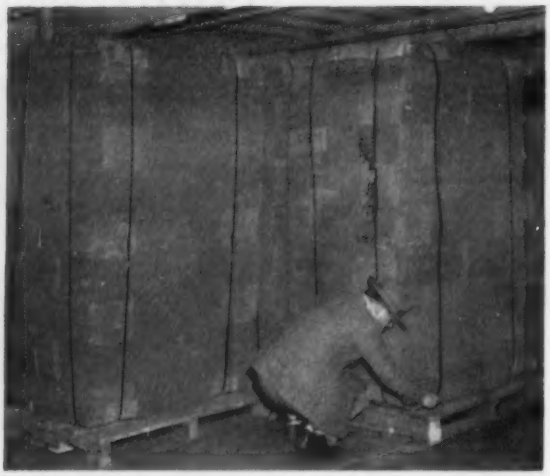
For full appreciation of the progress, a word is in order showing the contrast of one of the original frozen food packaging lines.

Filled cartons from an over-wrapping machine were hand-arranged on trays in three rows of ten each. Loaded trays were then stacked onto racks and wheeled to Bird's Eye freezers.

These units—the double-contact plate type invented by Clarence Birdseye and subsequently perfected by Amerio—are still considered by Seabrook as the most efficient for freezing packaged frozen foods.

The company cites the unit's low initial cost, low refrigeration requirements due to direct contact heat transfer, performance dependability, and generally freedom from trouble.

AFTER manual filling with packages from the wrapping machine, trays are hand racked. Note that redesign of rack unit has provided curved guide ends that permit faster loading.



CASE BLANKS, formerly shipped in bundles of 25, twine tied, now arrive at plant in these 6-ft.-high stacks of 900 units bound with metal strap. Fork-lift truck handling of palletized stocks save many man-hours.

LOW-LIFT TRUCK leverage was extended by addition of these company designed prongs made from channel metal. Thus bales of 900 knock-down cases are handled more efficiently.

Chalked against this type, however, is the disadvantage of a higher labor requirement compared to continuous-contact freezers.

Let us now recount some of the changes in production line layout and stepped-up mechanization by which the company reduced costly labor phases of batch type contact freezers.

A crew of at least three men formerly was required just to push a mobile tray rack to the freezing stations. Here trays were removed by hand and arranged in stacks of seven on a roller conveyor which traveled along the sides of the plate-type freezers. Each stack was then hand pushed to the "frosting unit" which was to be loaded next.

Stationed beside two of these units (set facing each other) an operator inserted trays between the freezing plates. He would lift a tray from a stack, carry it to the freezer, raise or lower it to proper position, then shove it in.

When the freezer was loaded, plates were compressed, then doors were closed and locked. The subsequent unloading then reversed the cycle and was equally time consuming.

Coming out, the trays of frozen packages were tiered in seven-high stacks on a second roller conveyor parallel to the first, but located on the opposite side of the freezers.

Stacks were then pushed on the rollers to the case-packing station, where packages were slid by hand from the trays onto tables supplying the many manual case packers.

New Way Projected

To change all this, time-motion studies were conducted on all of the line operations from package-wrapping to warehousing of cases. These investigations were jointly conducted by Seabrook's industrial engineering department and time-motion specialists of a management consultant firm.

Stop-watch timing and worker-movement studies during freezer loading and unloading revealed many disturbing facts. Time was lost when it was necessary to load one of two facing freezers and concurrently unload the other. Worker movements interfered. This was remedied by relocating freezers side-by-side, making long rows so that all doors now open onto a wide common aisle.

Another finding was that time necessary to open and close a freezer was proportionately high compared to loading and unloading time. This ratio of door opening and closing to loading and unloading was considerably reduced when the battery of Amerio contact-plate units, with freezing capacity of 1,500 packages of product, were installed to replace the former units, which were limited to 900-package capacity.

Installed in approximately the same floor area were 77 of the new units which not only replaced but increased

by more than 150% the capacity of the original 44 units.

Also employed are 30 Frick-Murphy combination contact-airblast freezers.

The packages are manually trayed as they are conveyed from the wrapping machine, using new trays precisely designed to hold the standard size package while permitting spacer bars between rows. Filled trays are now manually loaded into caster-wheeled racks each of which transport a load accurately spaced to fill one batch freezer.

Justified, too, was redesigning of transporting racks when the new capacity freezers were installed. But upping the capacity of the rack-transports from 900 to 1,500 lb. of packaged product in no way raised the labor burden. Reason: With the improved layout, transfer racks are now moved from traying station to the freezers by battery-powered low-lift trucks and similarly from freezers to pack-off area.

In brief, one man and a power truck have replaced several three-man crews that formerly pushed the racks.

In truth, there were a number of trial and error intervals in the period between the dropping of the old procedure of the abandoned line and the attainment of the present advanced methods. One of these interludes saw attention centered on the procedure for transferring trays from the rack to the freezer.

First tried was placing the rack of trays several feet from the freezer. Thus, with much less movement and effort, an operator could load or unload a freezer in reduced time.

Even so, time-motion studies were repeated to determine whether this procedure could be further improved. And it was then demonstrated that, though motions for this operation were less than before, there was still excess movement—too much effort expended and unnecessary time consumed.

As a solution, additional improvements were made in equipment and procedure, with the result that today three operators can load and unload all 77 freezers and be less tired at the end of a shift than formerly when attending much fewer freezers.

Here are the details: First off, new mobile racks were designed to fit against frosting plates accurately in the space between the opened freezer doors. Shelves that support the trays were then designed to hold the trays in exact position to slide from the rack into the space between the plates.

FOR DETAILED flow-view of Seabrook operation, turn to this month's four-page FE foldout—"Freezing Line 'Doubles' for Peas and Limas" (p. 118-121).

Ends of the angle-iron shelves are now curved down to serve as guides for more ease in loading as well as for assuring accurate alignment of the trays when pulled from the freezer.

Then there was devised a special tool that makes it easy for the operator to slide, with one simple motion, three trays into the freezer at one time. Hooks on the end of the push-pull bar fit over the handles of the trays to permit pulling them from the freezer three at a time.

Loading-Bar Evaluated

In an effort to learn the most efficient tool, from the standpoints of volume production and fatigue to operator, different push-pull bars were made that handled two, three, four, and five units at a time.

These lengthy studies proved that the three-prong push-pull bar was most suitable. Each additional prong meant pushing and pulling an added 30 lb. And each reduction in the number of prongs increased loading and unloading time.

The three-prong bars, now made of aluminum tubing over hardwood core, have proved the best all around and are now standard.

One of the most important gains of the present system is the fact that the racks now can be used as a unit of measure on which to base individual incentive pay for freezer loading and unloading.

Novel Case-Loader Indexing

Of major consequence was the modernization of case-filling procedure. Manual case-loading was replaced by a sequence that is fully automatic except for tray dumping and indexing-machine controlling. Required was considerably more engineering by the plant staff than merely installing a mechanical case loader.

Indexing packages, in unbroken lines four abreast on the conveyor feed to the automatic case filler, presented many mechanical problems. Here is how the difficulties were overcome to permit case loading at the rate of 52,000 packages per hour with the present three case-off crews of eight workers each:

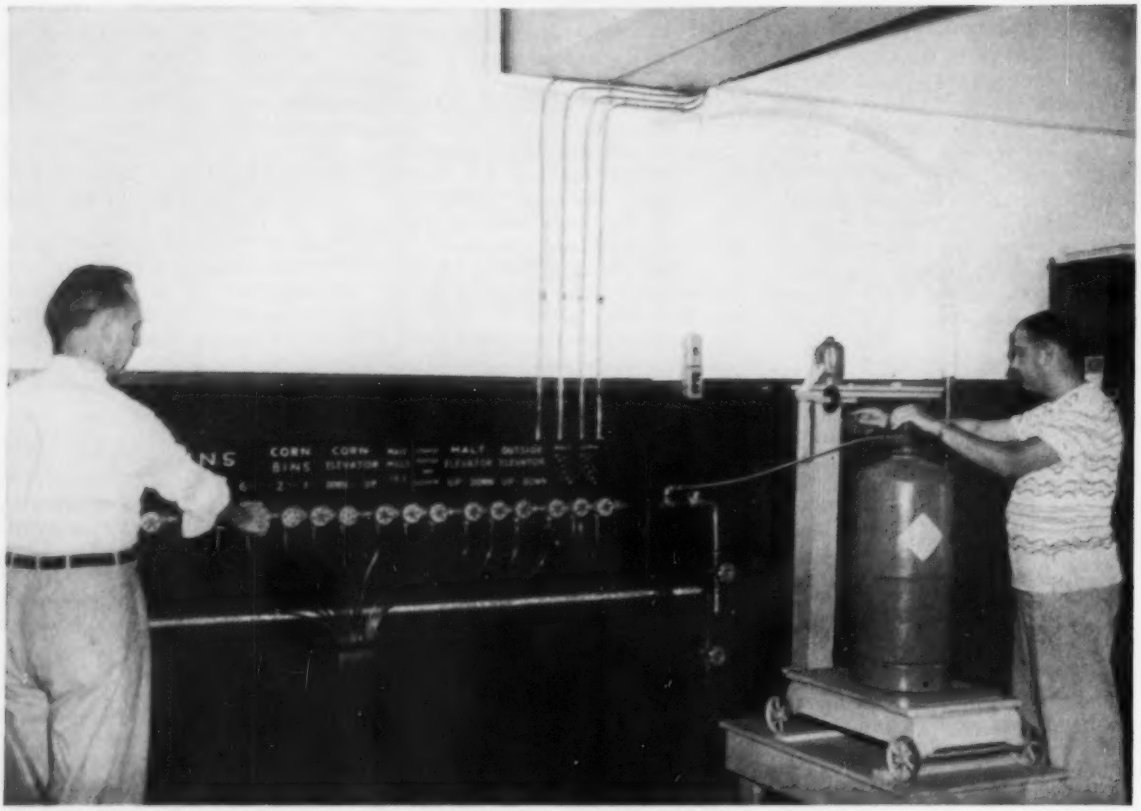
Racks loaded with 30 trays, each with a 30-lb. load, and also with 15 trays of 40-lb. capacity, are immediately transferred from freezers to case-packing by an electric truck.

Case-Off Operation

Company engineered de-traying conveyor systems transfer frozen packages from freezer racks and feed them

(Turn to page 209)

ACTION CLOSEUPS. Left photo: Trays are unloaded three at a time onto a 52-in.-wide wire belt, which advances them until four rows touch stop at side of conveyor (foreground) that feeds to automatic caser. Right photo: Next, four rows are elevated by manually operated hydraulic lift (A) to level of feed conveyor. Then the 40 packages in four rows are transferred from lift to conveyor by a sweep (B) operating in channel (C).



INTO BIN 6 go 3 lb. of fumigant, via flexible hose connecting cylinder and pipe system. Scale beam is first set to desired dosage. Next, three valves are opened—cylinder, air, and one of 18 point-of-application valves on the panel. Then fumigant flows to specific spot. And that does it.

20 Spots Fumigated From 1

Surer, Safer, and in One Sixth the Time

Using centralized system, Carling's whole score of critical brewhouse areas are treated in a trice with new low-dosage fumigant

Second in a Series of Three Articles*

A. E. COOL and L. E. McQUILLEN

Respectively, Supervisor of Brewhouse, Carling Brewing Co., St. Louis, and Vice-President, Ferguson Fumigants, Inc., Ferguson, Mo.

Carrying out a well-planned preventive sanitation program is—as anyone can appreciate—a considerable task.

It takes time. And time costs money.

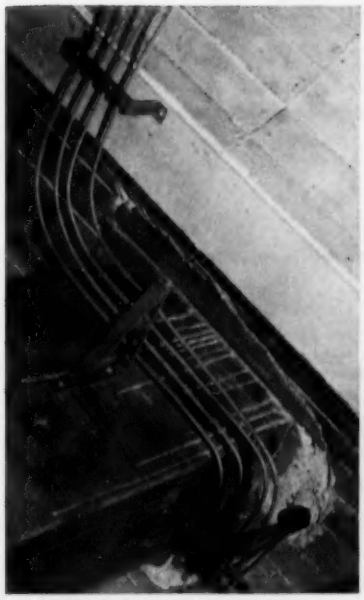
Long aware of these factors, Carling Brewing Co. of St. Louis has never spared expense in keeping its brewery in spic-and-span order, and meanwhile has ever been on the lookout for means of improvement.

Particularly, there was a phase of its brewhouse sanitation—a most essential routine involving insect control—that merited a thorough evaluation, with the twin goals of saving time and cutting costs.

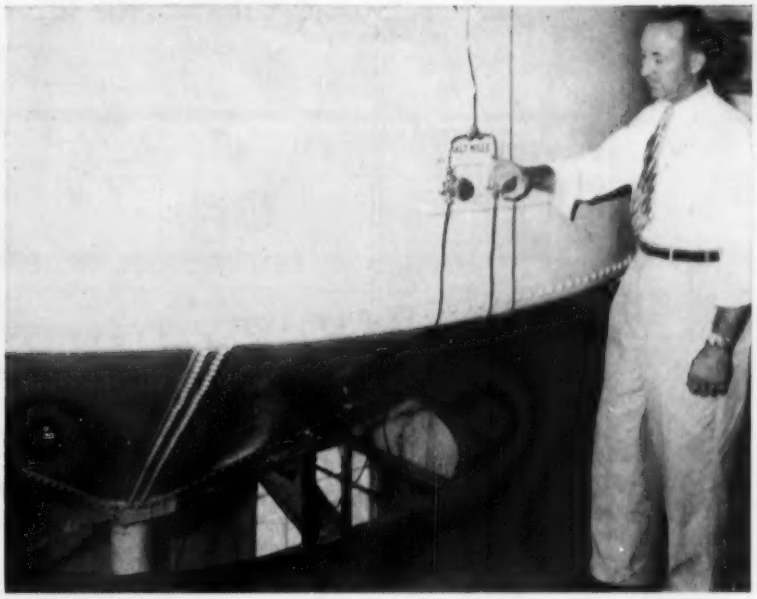
What this brewery sought was a simpler, safer, more effective, and less expensive method of fumigating 20 scattered spots in the brewhouse of the plant.

Key decision of the company was to call in Ferguson Fumigants, Inc., of nearby Ferguson, Mo., to survey its insect-control system and make

*Safety engineering of the fumigation system will be the subject of the concluding article of this series, to appear in a forthcoming number of FE. The initial article was "Better Spot-Fumigation—With Only One-Third the Labor" (FE Oct., p. 62).



CEILING CLOSEUP shows ¼-in.-dia. copper pipes that carry quick-acting fumigant to brewhouse areas.



AUTHOR COOL turns valve to feed fumigant to Malt Mill No. 1. Single copper piping splits just above two valves so fumigant can be fed into either of two mills on floor below. Malt hopper is also treated.

recommendations for a better one. And the outcome was the cooperative development of a highly efficient centralized fumigating system.

Taking two pipefitters about two days to install, this was a completely enclosed arrangement of lines for fumigating the 20 areas from a single remote point by the mere opening and closing of valves.

This new system has fulfilled the company's goal—has proved an easier, less hazardous treating operation that saves both time and money.

No longer are the company-licensed fumigator and his assistant apprehensive about their job—for the new method does not expose them to fumigant hazards. Instead of walking and climbing around the facilities and carrying along fumigant, gas masks, and a halide leak detector, they work from a single spot, shooting fumigant through a closed system.

Previously, it took these men about 3 hr. to spot-fumigate the 20 areas. But this job now requires only about 30 min.

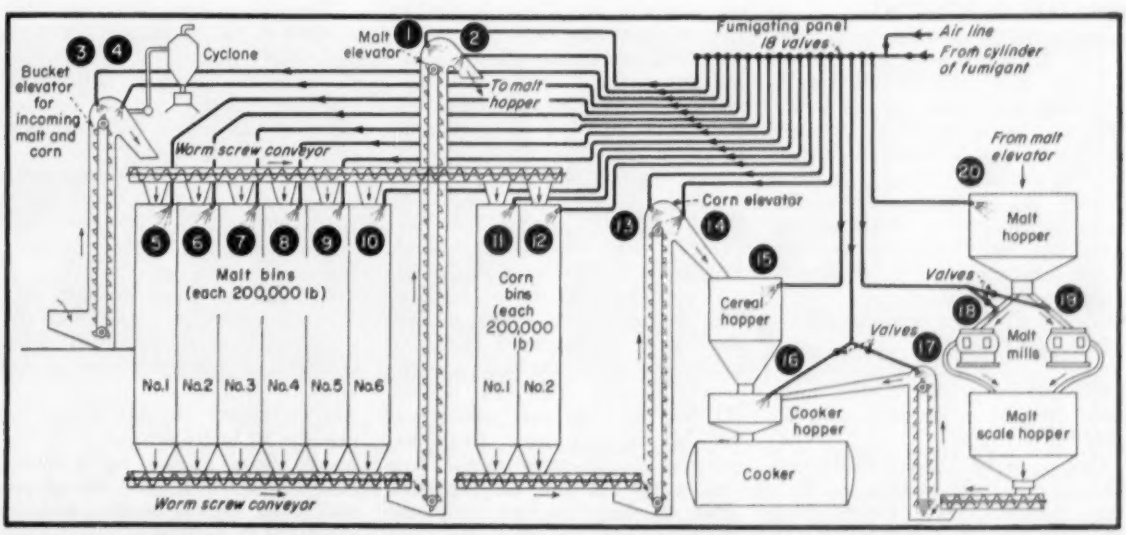
And today fumigant isn't wasted as it was by the former treatments, in which it was judged that some 25% was lost to the atmosphere.

Another time-consuming chore involved tedious toting of cases holding two dozen 16-oz. cans of fumigant, which had to be opened and the empties disposed. Moreover, application of fumigant was difficult because many areas were not easily accessible.

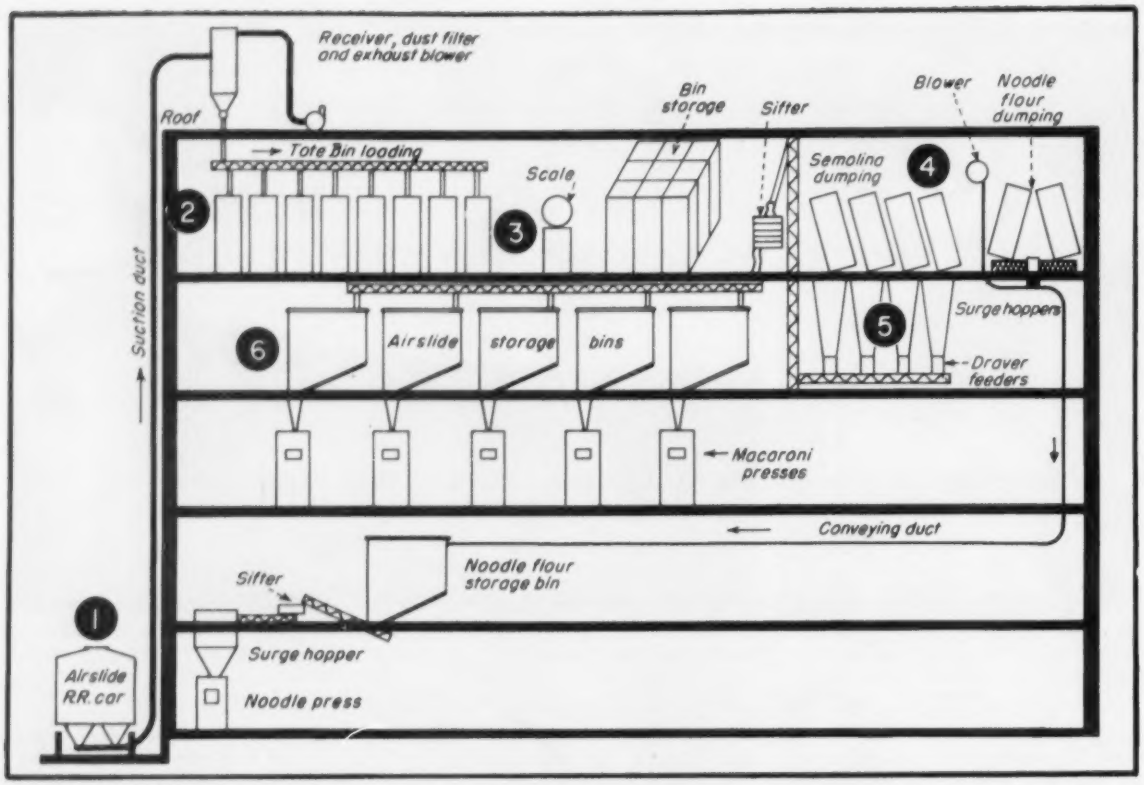
How System Works

In the new operation a scale-mounted, 100-lb. cylinder of fumigant is hooked up by polyethylene hose to a ½-in. pipe in the fumigating panel (see drawing). Piped fumigant is fed, by successive opening and closing of 18 valves, to 20 spots in the brewhouse. Each time a valve is opened,

(Turn to page 159)



DOWN TO DETAILS on Carling's highly efficient network fumigating system, with all 20 dosage points indicated.



SCHEMATIC shows new bulk-handling system for unloading, storing, dumping, blending, and directly feeding flour or semolina into macaroni and noodle presses at Delmonico Foods, Inc. Note systematic utilization of floors. Operations are numbered—(1) to (6) to key to specific illustrations on opposite page.

In-Plant Portable-Bin System

Speeds Flour Into Process . . . Sharpens Inventory

WILLIAM G. HOSKINS
Glenn G. Hoskins Co., Libertyville, Ill.

Three prime targets were ranged by Delmonico Foods, Inc., of Louisville, Ky., when it installed its new highly engineered flour-and-semolina handling system:

- First, this company sought the facility of unloading, and dumping in process bins, 100,000-lb. carloads of flour or semolina in routines of 8 man-hours per car.
- Second, it wanted accurate weight-checking of flour to serve as a continuous inventory of stock.
- Third, it was desired to blend three kinds of flour or semolina with regrinds at any ratio.

Drawn up by Delmonico Owners Thomas and Peter Viviano and their chief engineer, Leo Buser, these objectives were efficiently fulfilled by our consulting firm, Glenn G. Hoskins Co. of Libertyville, Ill.

Careful preliminary planning—taking into account the needs of management as well as the requirements of the engineering and production departments—has resulted in an unusually smooth, versatile system.

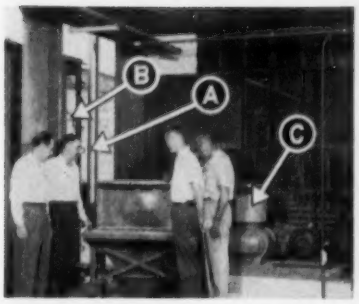
Selected for storage facilities were portable 4,000-lb.-capacity Tote Bins (Tote System, of Beatrice, Neb.). Primary reason for this choice was that overall cost of the bin-handling and storing system would run less than if a 2-car-capacity cylindrical tank were constructed outside the present building. Two other reasons: (1) New building work would thus not be required, since there was sufficient storage space for the Tote Bins on the 5th floor; and (2) movement of bins required only the simple use of small lift trucks.

True, some extra labor was seen required in the routine, as compared with employment of fixed tanks. But there were the advantages of flexibility and lower initial cost of the bin method. And it was felt that these more than made up the difference.

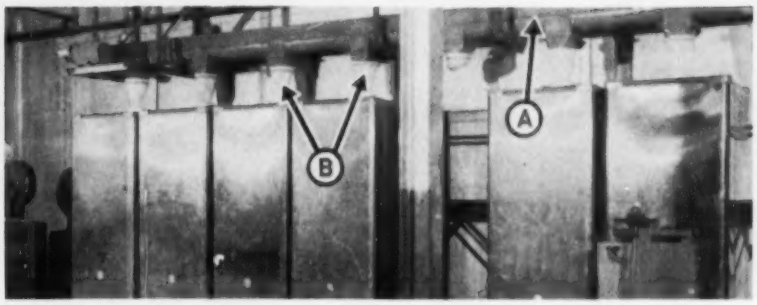
Referring to the drawing (top) and illustrations (accompanying page), key-numbered operations show steps in the advanced system of bulk handling flour or semolina.

In addition, there are two Tote Tilts for dumping noodle flour, together with adjustable speed drives (Reeves) to permit blending of two types of flour in any desired ratio. Also, a blower (Roots-Connersville) provides air under pressure to convey noodle flour to the automatic-discharge noodle-flour press storage bin on the 1st floor of another building about 300 ft. away.

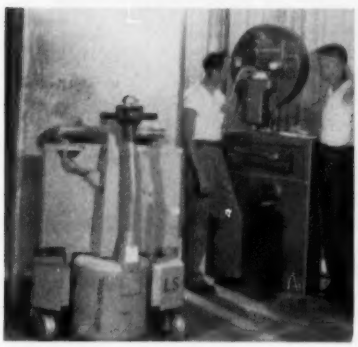
Six Closeups of Streamlined Flour Handling



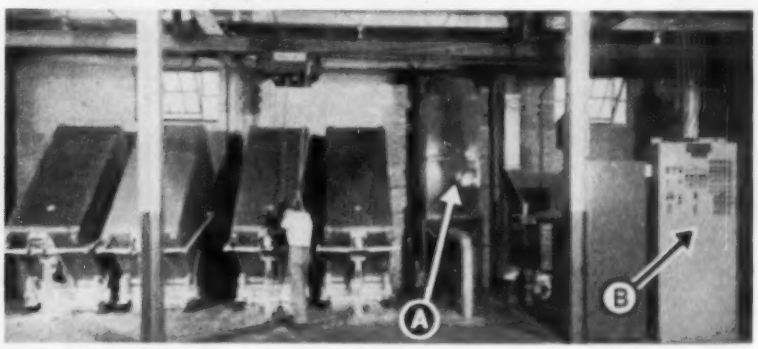
1 **TO PERMIT** emergency dumping of bags of flour in box cars, portable dump hopper is attached to flexible metal hose. Pipe (A) can be connected to nozzle on discharge of GA Airslide car (B) to draw flour into 2-compartment receiver (Dracco) and bag-dust filter on roof. Blower (C) activates air slides on cars.



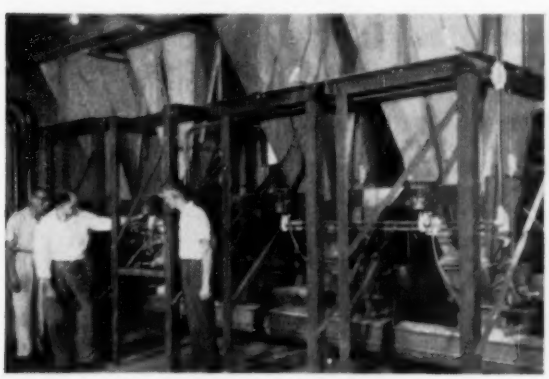
2 **FROM RECEIVER,** semolina is discharged into worm screw-conveyor (A) that feeds into eight Tote Bins. These bins are connected to conveyor with dust-tight nylon sleeves (B). As first bin fills, semolina backs up into screw conveyor, and it is then carried over to second bin and so on down the line until all are filled. This feature enables flour-room operator to let load-system run automatically for more than an hour, while he dumps bins or tends to other duties. His handling of a bin from storage to loading, weighing, and back to storage takes only 4-5 min. And in this way Delmonico Foods is able to run through 25 bins covering a carload in a mere 2 hr.



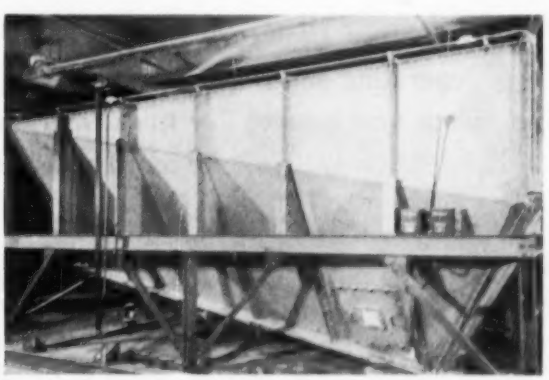
3 **WEIGHTS** of all Tote Bins were adjusted at manufacturer's plant. Tare weights of lift truck and bin are checked on Toledo Printweigh scale. Net weight of semolina in bin is printed on card kept in bin's holder. Ample space on 5th floor permits storing different types of flour and semolina for simple inventory.



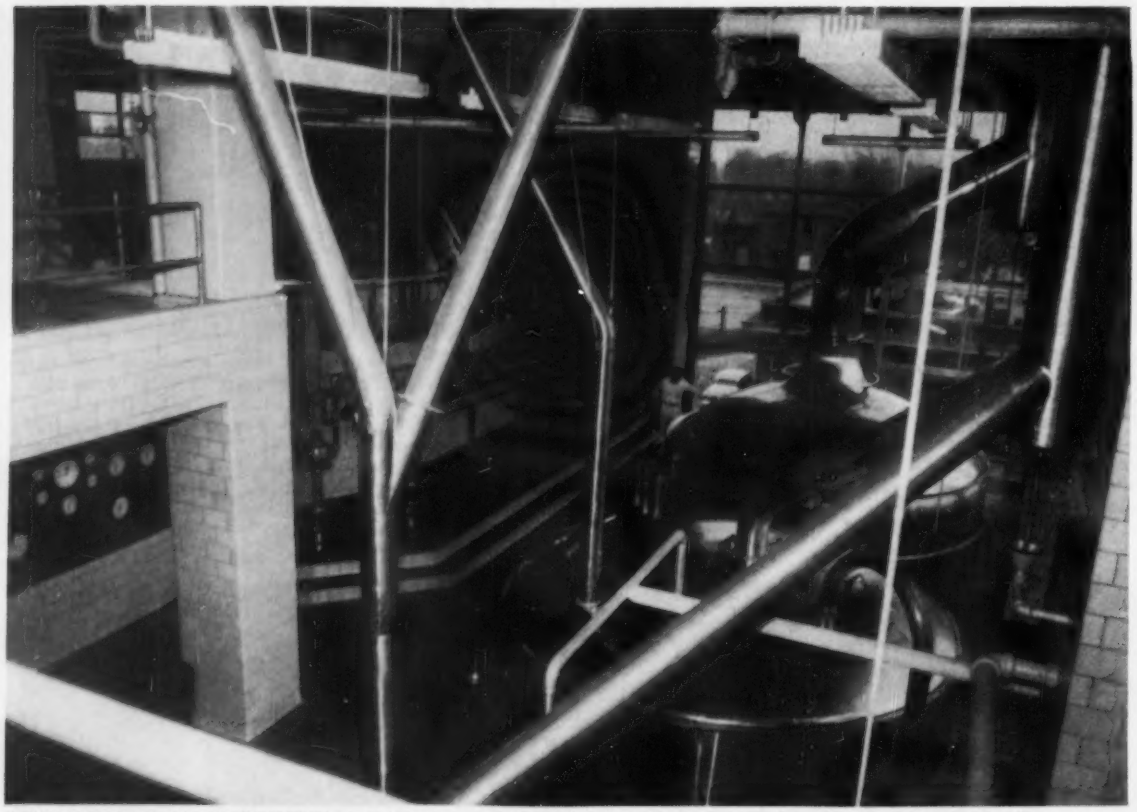
4 **FOUR TILTING** mechanisms, raised by overhead track-mounted winch, cant the bins to 45-deg. angle for unloading. Complete discharge of flour from bins is assured by vibrators mounted on the tilting devices. Dracco bag-dust filter (A) controls dust generated in surge hoppers, press storage bins, and noodle-flour dump station. Control panel (B) for macaroni flour dumping-and-storing system includes indicating lights that show which components are in operation. There is additional tilting equipment employed by the company for noodle flour. Especially to be noted is the high order of sanitation that is maintained in the Delmonico plant.



5 **FROM 5TH FLOOR** dumping station, flour or semolina drops into these four surge hoppers located on 4th floor. Draver feeders on discharge of these hoppers enable blending of three kinds of flour with 1-to-10% regrinds, in any desired ratio. Use of the surge hoppers permits change of empty Tote Bins without having feeders run out of flour.



6 **SPECIAL** press-storage bin holds enough flour to run a 1,000-lb.-per-hr. press for 24 hr. High-low level probes (Fielden Tektor) sense and light-indicate level of flour. Blower for Airslides turns on when probe at bin discharge is uncovered, and valve opens to let air flow to Airslide. Timer holds valve open until flour floods outlet, then valve and blower turn off.



SINGLE-FLOOR ARRANGEMENT of all brewing vessels makes for efficient operation. Automatic controls (left), lauter tub and grant (center), brew kettle (right), and cereal cookers (foreground) are all within a few steps.

"Horizontal" Plant Layout Ups Brewing Performance

¶ Further, Utah company's novel brew kettle aids high-altitude boiling, cuts operating and cleaning labor . . . ¶ Dairy-type cooler for wort improves plant heat balance . . . ¶ and stock-house tank suspension eliminates heavy floor construction, reduces refrigeration load

A. E. SCHARR
Production Manager, Fisher Brewing Co., Salt Lake City, Utah.

As a matter of fact, spectacular building in the brewing field *hasn't* been wholly confined to the large "nationals."

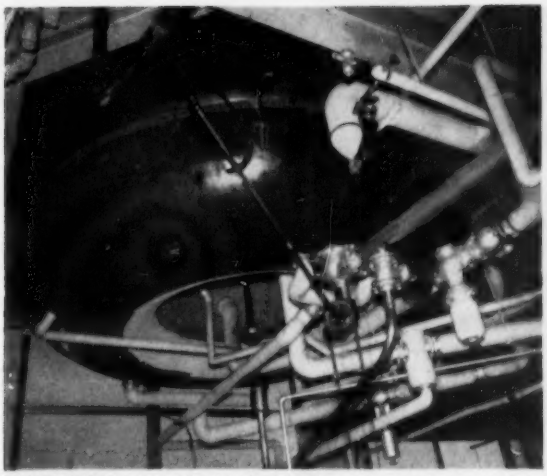
That the regional breweries, also come up with modern, advanced-scale construction is demonstrated by the recent expansions at Fisher Brewing Co., our plant located in Salt Lake City, Utah.

To supply the growing Pacific Intermountain market, we invested $750,000 in a new brewhouse and cellars, after considerable study and engineering research.

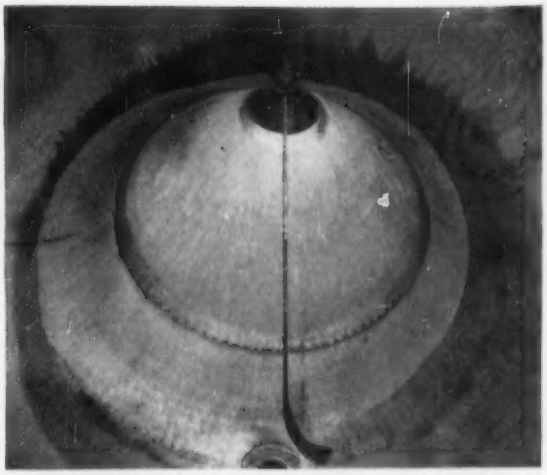
This design places all brewing vessels on one floor—a feature that eliminates stair climbing and makes all unit operations easily accessible to the brewer. Also included are automatic controls that minimize the element of human error.

Modern in architecture, the new brewhouse is specially engineered for quality control. The laboratory, equipped with large windows, views the entire brewing operation. And wherever possible, Thermopane windows (from floor to ceiling) are used to get maximum natural light.

Keying the operation was selection of a brew kettle suitable for boiling at



ALL-COPPER brew kettle has high-pressure steam jacket (center cone) and low-pressure jackets (bottom) for proper wort boiling at high altitude.



KETTLE INTERIOR: High-pressure cone is topped by agitator drive that rotates at 3 rpm. Large heating surface and rapid heat transfer permit rapid boiling.

the 4,200-ft. altitude of this brewery. Specifications also called for a unit requiring minimum operating and cleaning labor.

Top Kettle Performance

We selected a kettle made by Ziemann Co., Stuttgart, Germany. It's unique in this country. Instead of the "percolator type" heating element, this unit has two separate steam-jacketed sections.

Kettle efficiency plus automatic controls give us a daily production of 800 bbl., which requires only three brewers or 24 man-hours.

In operation, steam pressure (125 psi.) is reduced to 25 psi. for the bottom-jacketed area of the kettle, where a temperature of about 267 F. is maintained. The jacketed rising cone in the center of the vessel is supplied with 40-psi. steam (287 F.).

These high-temperature sections produce a vigorous, rolling boil (see photo) which is given a circular, spiral-like motion by an agitator turning at 3 rpm. Kettle's large heating surface and effective heat transfer permit rapid boiling at this altitude.

Made entirely of copper, the 450-bbl. vessel is a special, smooth, hand-riveted unit. It brings incoming wort (157 F.) to a boil when pressure in the cone reaches 40 psi.

The large diameter of our stainless-steel lauter tub enables a rapid draw-off (125 bbl. per hr.) to the 28 cocks of the open grant below.

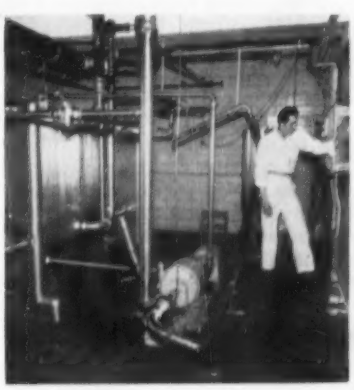
Cleaning of the kettle is simple since there are no tubes. After it cools, a workman easily scrubs the kettle clean in a mere half hour.

Adding efficiency to our operation is a wort cooler (Cherry-Burrell), one of the first of its type to be employed in brewing. It uses pre-treated brewing water in one section and refrigerated (33 F.) water in the other. The Btu. transferred to the brewing water by hot wort raises water temperature from 50 to 80 F., thus improving plant heat balance.

VIGOROUS BOIL is provided by kettle's special design which imparts "spiraling motion" to wort. High cone temperature adds impetus to rolling boil and develops current towards outer periphery of kettle. Agitator creates circular motion as wort passes across kettle bottom and returns upward to center cone.

Also, modern design of our glass-lined stock-house tanks cuts refrigeration load. Tanks are suspended from overhead beams by steel straps. Thus eliminated is the need for heavy concrete floors. In the brewery's refrigerated section, flooring is limited to the concrete walkways, or aisles, directly in front of the tanks.

This "floorless" type of construction permits better utilization of refrigeration. Only 75 tons are needed to keep the area at 35 F.



AUTOMATICALLY CONTROLLED heat exchanger cools 200-F. wort to 50 F. at 200 bbl. per hr.

1 **WHEELS** are split horizontally, placed on cutting head, separated into 32 wedge-shaped portions.

2 **WEDGES** are weighed, then each is added to a group of similar weight pieces prior to coating.

Dip Coating Puts Cheese Wedges *Back Up Front*

- PROCESSOR thus economically prepackages natural product in familiar shape
- RETAILER is saved headaches and losses, while pleasing the customers

FE STAFF

In spite of the wide acceptance of natural cheddar cheese prepackaged in ½- and 1-lb. film-wrapped slabs, there still continues a large demand for the wedge-shaped portions cut from the round wheels.

With this in mind, Oregon's Tillamook County Creamery Assn., which had already perfected a mechanized line for the slabs (FE Apr. '53, p. 90), again put a spotlight on the wedges.

Experimental work on prepackaging them had been shelved during perfection of the slab operation. Now this project was reactivated. And final result was installation of a plastic dip-coating system that—

- **Makes wedge packaging economically feasible.**
- **Provides the best available protection for the cheese.**
- **Eliminates labor, also cutting and dehydration losses at the retail point.**

Present production of the new line is 3,000 units (12 oz.) per 8-hr. day.

Preparing the Wedges

First step in the operation is cutting the wheels of cheddar in half along their horizontal axes. Then three wheels are placed in the wedge slicer (see top left photo). This has a cutting head comprising 16 stainless steel wires stretched tightly from center hub to outside rim.

Cutting head is drawn downward through the cheeses by manual cranking. This produces 32 wedge-shaped slices from each of three wheels, making a total of 96 portions, each of approximately 12 oz.

Since this method of cutting does not result in pieces that are exactly uniform in weight, each portion is scaled, then combined with others in the same weight group before coating.

Then Comes Coating

Weighed wedges are next impaled on prongs of the stainless steel wire racks used to convey them through the coating machine*. This unit is installed in an air conditioned room for safety, comfort, and operating efficiency.

Racks move through two coating tanks and over three drying levels on 90 ft. of roller chains powered by a ¼-hp. motor. Drying is accelerated by a gentle blast of heated air.

In the first tank, wedges are dipped in thermoplastic wax. This tank is electrically heated, maintaining a temperature of 150 F. Next, the cheese is immersed in

*Machine and dipping method were developed and patented by R. A. Zuercher, vice-president, Palmer Pre-Pack Corp., Chicago.

3 **CHEESES** are impaled on stainless prongs of dipping rack (left). Filled rack is hung on conveyor (right), that dips wedges in melted wax.

4 **COATED** wedges are dried then redipped before packing.

Steril-Kote plastic. This coating is cooled to approximately 65 F. by water coils in the tank's bottom.

Loaded racks travel through the three drying levels, then the dipping procedure is repeated to insure against the possibility of pin-holes in the coating. About 15 min. is required for the two round trips through this unit. Wedges are then removed from the prongs, and the apertures made by these are carefully, manually closed to provide a perfectly sealed coating. Coated wedges are then labeled, with exact weight of cheese noted on each.

Packaging Complete Picture

One of the knotty problems faced in the finished production of the wedge slices related to assurance of a safe, easily filled case. This was finally solved by first arranging 12 of the wedges in a semicircle, then binding them closely together with a stapled strip of paper-board to guard against their shifting. The bound wedges are then slid into the closely fitting carton which, for product protection, is made of 200-lb.-test corrugated board. Filled cases are stored in 40 F. rooms until shipped.

To serve the cheese, consumers need only peel off the coating—a very simple operation.

5 **LABELED** weight-marked wedges are arranged in a circle, bound with corrugated-board strip, then slid into final shipping container.

Wedges to Slabs to Wedges

Big-volume retail outlets have been the scenes of some swift and revolutionary transitions in food packaging. And processors, being acutely sensitive to the demands and needs of these mass-markets, have hastened to produce favored types of packages.

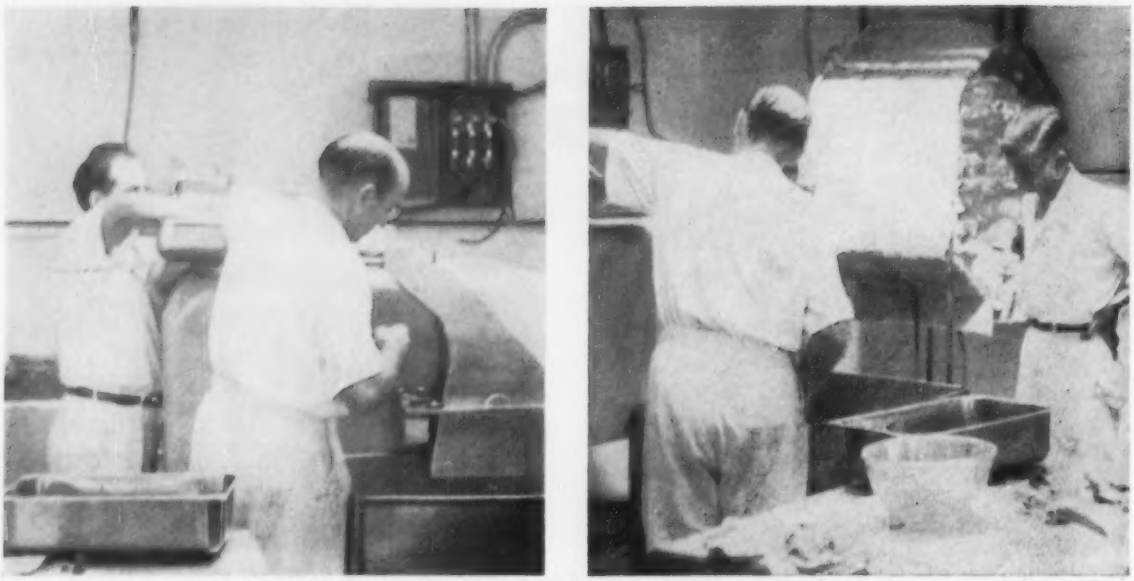
Obviously, a well-meaning aim. But how assure mutual benefit to both processor and retailer?

Take the case of prepackaged cheddar cheese in ½- and 1-lb. slabs. For the retailers to call for these items was reasonable, because cutting, weighing, marking, and wrapping of wedges from a round-wheel cheddar was time consuming and, also, resulted in some loss of product. For the cheese makers, too, the wedge-shaped slices seemed to present almost insurmountable packaging problems.

So in their frantic haste to supply the market, many cheese makers changed to 20-lb. rectangular blocks that could be easily cut mechanically and wrapped with automatic equipment.

However, the fact remained that the wedge-shaped slices have continued to stand high in the customers' eye. They are not only the "old familiar" but also connote to many buyers that the cheese has been freshly cut from a wheel, thus appearing more desirable and appetizing.

Consequently, Tillamook County Creamery Assn. of Oregon reactivated its experiments on packaging wedges. And the upshot has been installation of a unique dip-coating process which, as described here, pays dividends to both maker and seller.



IMPACT-IN-AIR COMMINUTOR is mill employed. Left: Chicken parts and broth are first reduced to a non-gritty puree. Right: Then other chicken pieces are impacted to uniform particles before being put in puree. Re comminutor see Author Kovac's article, "Impact-In-Air Grinding Wins Significant Benefits," FE May, p. 69.)

They Turned *By-Products* Into Profitable *Co-Products*

—by pooling pertinent know-how on ingredients, seasonings, and new process techniques. Result: A molded heat-and-serve item than can be made in various shapes from poultry pieces or other foods . . . Process and equipment detailed . . . Food product variations explored

GEORGE M. KOVAC and ROY E. MORSE*

Respectively, President, The Cog Corp., Chicago, and Research Director, Wm. J. Stange Co., Chicago

While we often hear of our industry converting by-products into salable foods, it is only rarely that the processes provide items having a value equal to, or greater than, the parent commodity.

But recent developments in meat and poultry technology have brought ingenious methods smoothing the road to such products.

Take, for example, the new frozen heat-and-serve item in popular stick form—called Chickettes-Drumstick—developed and made at Waldron's Poultry & Egg Co. and Dee Jay Farms, Cincinnati. This "by-product grown to co-product stature" resulted from management's enterprising efforts to win better and broader utilization for its poultry by-products.

Moreover, the method may readily be applied to many other foods for production of a wide variety of specialty items (panel, next page).

Employed is a patented process (see flow diagram) applied in commercial production by the Cincinnatians in cooperation with D. Ridenour (Wm. J. Stange Co.) on seasoning formulas and with The Cog Corp. on comminution techniques.

First, chicken is cooked, either in a steam-jacketed kettle or pressure cooker, until the meat slips readily from the bone (which saves considerable time).

Then after cooking, the separated wing tips (long bone of the second joint removed), whole necks and backs, hearts, chicken skins, and gizzards are comminuted with measured amounts of broth. High rotor speed, impact edge of blades, and a fine screen are used in this pass. Result is a non-gritty pureed paste.

With stainless steel on all parts contacting the product, the mill features an integrally supported spindle mounting. And its "snap-apart" design permits quick changing of the rotor to its knife edge, the screen to a coarse opening, and rotor speed to approximately ½ that of the pureeing operation.

*Since the association noted here, Mr. Morse has become Professor of Food Technology, Rutgers University, New Brunswick, N. J. (see item in Men & Companies, p. 219).

With the comminutor thus rearranged, parts of light and dark meat, along with previously pureed meat, are passed through it. This results in a product with light and dark meat uniformly distributed as readily recognizable pieces of chicken.

The screen opening in this pass is quite large and can be varied to suit individual preferance as to size of discernible chicken pieces. Bruised breast meat, which must be sold as "B" grade or incur a 10% loss of product in removing the bruise, therefore can be profitably used.

With the meat thus prepared, other ingredients are brought along simultaneously. Rice was selected as the mixing agent because of it's good binding qualities, flavor, and appearance. Two types of rice are employed—one variety for binding and long grain for appearance. Some thought was also given to the use of pre-cooked rice for saving time and effort in preparation.

Puree, piece meat, prepared rice, and chicken seasoning are now blended together in a mixer. Next required is chilling to about 40 F. to permit extrusion molding, since for better results items are all comminuted while hot. At this point, after deaeration and cooling in the brine-jacketed feed screw, extrusion becomes continuous—to any distinctive shape, with use of a cutting wire.

A suitable commercial-type breading may be applied. Or comminuted, seasoned corn flakes may be used. Later offer a desirable brown color and a tasty flavor. They are uniformly ground (dry) in the same comminutor, using impact edges of blades, high rotor speed, and fine screen.

The molded (or extruded) sticks roll through this breading compound down an incline, then are frozen and packaged—ready for distribution. Various shapes and sizes can be used for special advantages. And the consumer need only heat the pre-cooked product before serving.

Further idea is use of gizzards and hearts with flour and proper seasonings to produce a tasty, nutritious spread. Stuffing in casings or forming burgers result in still other easily used items with ready sales appeal.

Opens Door to Other Foods

With only slight adaptations in the process described here, other food items may be used to produce similar specialty products. And incidentally, the shapes can be varied to make novel designs. Items seen having potential include—

FISH STICKS—Using cleaned but not filleted fish, process eliminates sawing (fish dust) loss and lends itself to a high-speed continuous operation. It also allows admixing dark- and light-meat fish.

LOBSTER STICKS—Employing lobster frames with meat that adheres to recesses and cavities.

CRAB STICKS—Using crab frames with meat that adheres to legs and cavities.

BEEF STICKS—To produce a breaded wiener-like product.

BACON STICKS—For a smoked, seasoned product.

SHRIMP STICKS—A flavorsome Friday-night special.

TURKEY STICKS—Produced same way as chicken sticks.

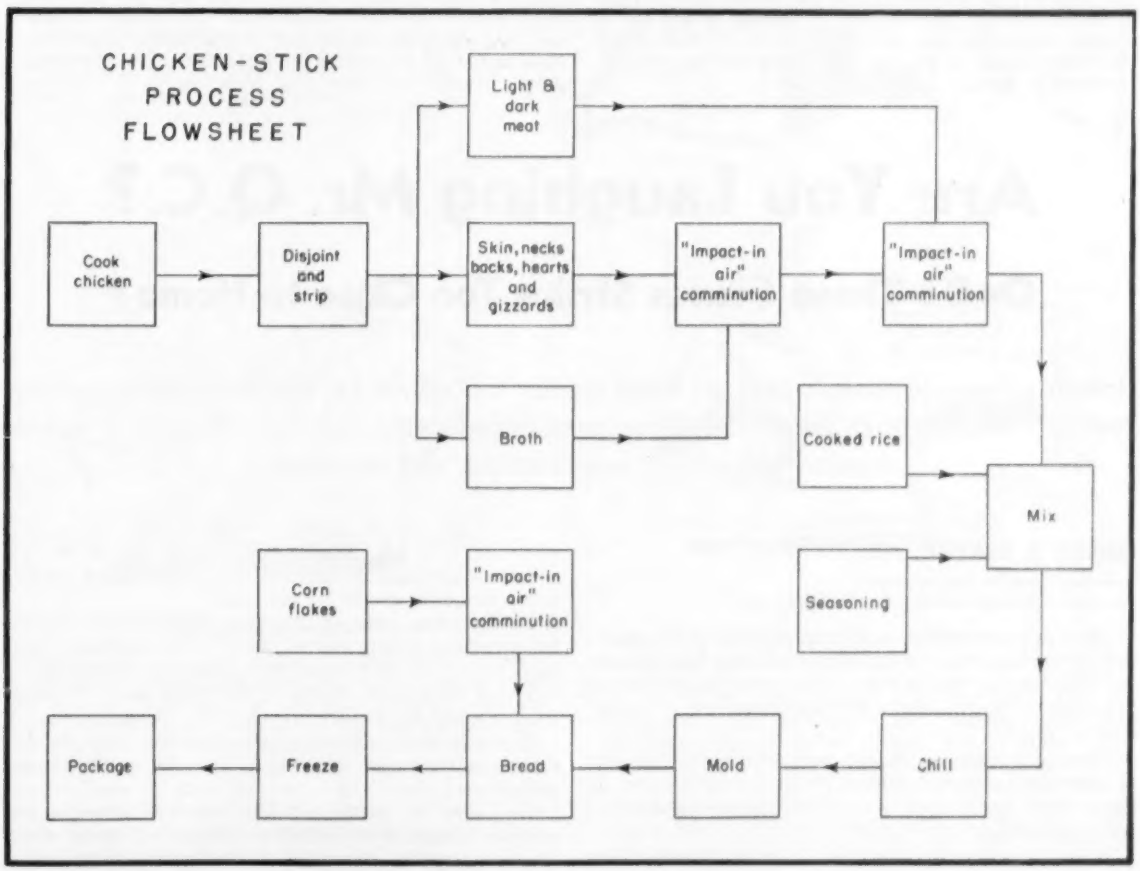
VEAL STICKS—A nice specialty item for meat packers.

HAM STICKS—For the quick, heat-and-serve meal.

CLAM STICKS—Tasty item for the seafood gourmets.

OYSTER STICKS—A good cocktail adjunct.

Many of these items have already been worked out on a pilot-plant scale following the process illustrated here.—*R.E.M.*



The Voice of Quality Control

Yes, Mr. Q.C. has the factual record of product quality. But what good is it if he doesn't take his rightful part in full, vigorous participation at the conference table? If the know-how of quality control—in finished products, in process regulation, and in evaluation of raw materials—isn't emphasized at the top level, then the job is only fractionally done.

Busy . . . Busy . . . Busy!

What's happened here? Well, Mr. Q.C. finds himself with more than he can handle—having failed to establish a quality control organization that faces up to its responsibilities. Only when Mr. Q.C. straightens out this situation will Messrs. Sales, Operations, and Management get the timely, pertinent quality information they need. Fact is Mr. Q.C. must 'sell' all users of his service on the idea that more is involved than just hit or miss lab tests. For reliable quality information he must coordinate a clear-cut control scheme, with these five elements thoroughly resolved: Well-defined objectives, Proper sampling plans, Reasonable and flexible testing schedules, Good statistical procedures for gathering and interpreting data, Coherent and convincing reporting.

Are You Laughing Mr. Q.C.?

Or Do These Scenes Strike Too Close to Home?

Grin or grieve—it remains that too many quality controllers fall victim to these working "twists"—which range from inter-department impediments and task tensions to various spasms and tics of specifications and techniques

HENRY B. ELKIND, JR.
Supervisor, Control Testing Laboratory,
The American Sugar Refining Co., New York City

All of us pretty well agree that an effective quality operation is very important to the success of every food processing organization. But at times, life in the Quality Control Department can be rough. Perhaps something is lacking. Call it "umph".

There are some reasonable explanations for the kind of difficulties a quality control group may encounter. In some ways, Q.C. work is a rather intangible kind of accomplishment.

It may appear to lack such punch as Mr. Sales expresses when he tells Mr. Management: "Last month we hit umpteen hundred thousand–a new sales record–14.8% above the same month for last year!"

Furthermore, some of the very characteristics needed for successful quality control, such as thoroughness, technical know-how, and conservative, weighed judgments, do not lend themselves readily to the stress when it comes to competing for the attention of Mr. Management.

These same characteristics may also foster other ills that can severely diminish the returns from the quality control activity.

And now let us run our eye over the accompanying sketches–intended to afford a close-up of seven major ailments plaguing those who work at quality control.

Specifications—Rough-Plus!

Here, Mr. Q.C. takes some really decisive action. But, alas, while under the influence of 'technique for technique's sake,' he's too long nursed the 'numbers game' and so has lost his perspective of realistic specifications. To get thus out of touch is all too easy—particularly when his liaison with Mr. Sales is weak. In consequence, ultimate requirements of the consumer are lost from view.

Findings In Curbstone English?

Sure enough, Mr. Q.C. is a very well informed technical person with a vast specialized knowledge of his subject. He may forget, however, that this is a prime reason why he was hired—that is, for his ability to grasp facts pertinent to the product with an insight that is superior to that of the others. This slipping his mind, he blithely pours out reports couched in a flow of 'magnitude sigmas'—all perfectly clear to him, true, but only so much gibberish to those who must have findings that can be readily fired into direct action.

Light Left Under the Bushel?

Mighty stunning, his array of charts and forms, equipment, and super-system. But it's all much ado about nothing if he doesn't speed out the information for use by Messrs. Operations, Sales, and Management. And if he's gathered a whole flood of data, who'll have time to digest it all? To use it? In short, Mr. Q.C. must face up to the continuing task of culling out useless data and delivering the really necessary key material in a form for ready application by plant management and the various departments.

Follow the Leader?

"I like this one fine! It's a dandy!" cries the Chief, after taste-testing several pops from the sample groups—and our sterling characters, Mr. S. and Mr. Q.C., quickly follow suit with loud echos of the Big Man's sentiments. But whoa! Don't reliable evaluations require that each person do his own rating without being influenced by others? They certainly do. And AAA Super-Duper Lollipops, Inc., might well consider establishing a trained test panel and also running careful consumer surveys to get closer to the true acceptability of its 'pops.

The Ones That Get Away

Tragic—but he's too late. And doubtless a lot more of the off-mix 'pops have already gone. All of which emphasizes the greatest of Q.C. sins—failure to nip inferior products in the plant before they can get out to the consumers. Likely, it wouldn't have happened if Mr. Q.C. had good finished-product control. But in truth, that's only part of it: Actually, every element of his department's operation must be right to insure an efficient job—incoming products inspection, process checks, lab testing, and all the rest. What's more, top teamwork with every department is required. For Q.C. can't do it alone.

They're ultra-fine on checking ⮟

CONTROL LAB examines all incoming raw materials and finished confections for extraneous matter.

And inspections ⮟

AT ONE of 39 plant-inspection areas, sanitarian initials chart. Report then goes to V.-P. Wiley.

This *Checking* on *Checking* Makes Sanitation Foolproof

Cracker Jack puts four sanitarians on periodic inspections, then "doubles" on them through a vice-president and outside consultant—and a similar sure cycle is applied for lab checks on materials . . . Company's routines for inspectors and rules for workers set outstanding pattern

W. R. HOLTZ
Chief Chemist, The Cracker Jack Co., Chicago

It is by checking, acting—and then double-checking on that checking and acting—that we make certain our preventive sanitation program at The Cracker Jack Co., Chicago, is as foolproof as we can make it.

This system assures that our routines are ever positive—backed by top management's stand that sanitation is a No. 1 'must' in the manufacture of our quality confections, Cracker Jack, and marshmallows. It is for this reason that considerable time and money go into this program, which is headed by Vice-President & General Manager W. D. Wiley.

Actually, we have mounted a multi-phase attack to keep the company's products contamination-free. Working through cooperative efforts from top echelon down to production-line employees, it comprises six highly organized drives on our objectives—

1. Weekly and fortnightly plant inspections.
2. Quarterly checkups by a qualified outside sanitation consultant.
3. Laboratory examinations of materials and equipment.
4. Employee-sanitation training programs.
5. Well-organized cleanup.
6. Selection of equipment, facilities, and practices representing the optimum effectiveness.

We will take each up in turn:

39 Areas Checked

Thoroughness in candy-plant sanitation is exemplified by our every-week or every-other-week plant-inspection routine.

Because of building size, and hence to facilitate the activities, the plant is divided into 39 clearly established inspection areas. Assigned to check specific zones of the 39 are four key personnel — day and night superintendents, plant engineer, and chief chemist.

To make certain there are no slip-ups, each inspector must initial and date inspection cards hanging from prominent spots in each assigned zone.

Inspectors then submit written reports to the vice-president. And as another check, the v.-p.'s secretary issues "track-down" tickets to inspectors every second week. These must be dated, initialed, and returned, with areas checked and not checked indicated.

Our vice-president reads all reports submitted, then sends notes to supervisory personnel responsible relative to

19 Checks of CJ Inspectors

A general inspection must be broad enough to cover cleanliness, housekeeping, and sanitation. Special problems apply to particular locations. Here are 19 targets:

1. **Debris**—Look for accumulation of cartons, rags, string, paper, etc. See that rubbish is cleaned up.
2. **Doors**—Check on hinges, locks, knobs, hangers, closures, and jambs.
3. **Electrical**—Report lights out, defective switches, exposed wiring, and anything else of a hazardous nature.
4. **Fencing**—See that fencing inside building is protected and painted, and that outside fencing is tight, in good repair, and painted.
5. **Floors**—Keep a check on floors, concrete or wood. Anticipate needed repairs well in advance. Report over-loading or excess traffic of trucks that have damaging effect.
6. **Fumigants and Insecticides**—Observe protection of premises requiring fumigants and insecticides for specific problems in certain locations.
7. **General appearances**—Note neatness, orderliness, and arrangement.
8. **Masonry**—Observe condition of walls (inside and out). Where masonry is cracking or there is indication of settling, report immediately.
9. **Mobile equipment**—Ask operators their opinion of trucks —4- and 2-wheelers as well as electric transports. Find out, first hand, the conditions, and check on complaints and suggestions for improvement.
10. **Obscenity**—Check any evidence in toilets, on partitions, posts, and elsewhere on the premises.
11. **Obsolescent equipment**—Make frequent inventory of all machinery and equipment, etc., not in use, and follow-through for disposition.
12. **Painting**—Report where painting is needed.
13. **Pest extermination**—Be alert, from a preventive viewpoint, for roaches, water bugs, silver fish, carpet beetles, ants, weevils, moths, etc. Present service is very effective—but popcorn, a natural grain product, is susceptible to some of these pests. Outside or inside the premises, watch for any evidence of burrowing or harborage of rodents.
14. **Plumbing**—Report leaking and dripping faucets, water pipes, steam pipes, etc.
15. **Roof**—Inspect regularly and make certain, at all times, that it is free of waste paper, rags, or other rubbish. Also note condition of all coping, flashing, and roofing. "A stitch in time saves nine," and many a preventive repair job can be made on a roof that may save hundreds of dollars later.
16. **Sanitary work habits**—Observe and report non-compliance to sanitary habits. Signs are posted, "Wash hands before returning to work." The simple sanitary habits practiced at home should be in effect here.
17. **Screens**—Check carefully to see if screens are up, in proper repairs, and kept closed. If a serious fly condition develops, report such locations for spraying. Fly-chaser fans should be operative.
18. **Smoking**—Report any failure to comply with "no smoking" instructions. Smoking out of bounds is hazardous. In smoking areas see that ample ash trays, sand-urns, etc., are provided.
19. **Windows**—Watch for broken glass, loose panes, leaks, need for caulking, etc.

conditions requiring correction. For example, a correction involving processing is brought to the attention of the factory superintendent. If the condition pertains to maintenance, then it is directed to our plant engineer. Those relating to use of insecticides, detergents, and germicides are the laboratory's responsibility.

The subsequent inspections reveal whether or not cited conditions have been corrected. If not, then our Vice-President issues terse notes to those supervisory personnel who should have taken the remedial measures. Or direct phone calls may be put through to bring quick action on serious conditions.

This same inspection system is carried out at our popcorn-storage facilities in Odebolt, Iowa, and Morris and Stanford, Ill. At these locations, inspections are the responsibility of the key personnel in charge.

At this stage, it might be well to point out that our Vice-President also makes quarterly, unscheduled inspections. Sometimes, he carries along a camera to snap shots of both poor and ideal sanitary conditions.

Another Outside Check

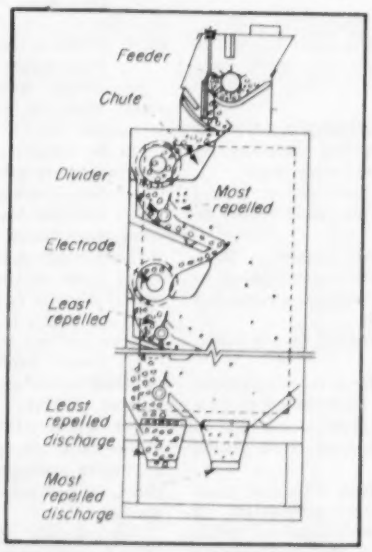
Quarterly tab on our plant conditions and popcorn-storage facilities are carried out by a sanitation consultant —the second prong of our attack:

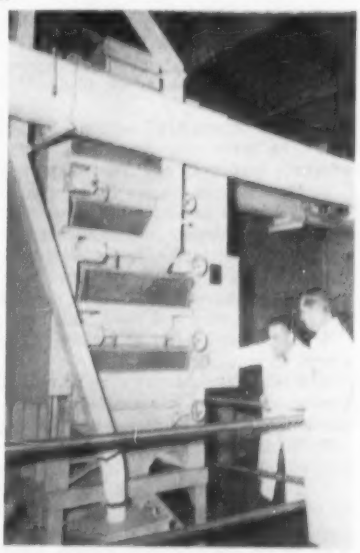
These "checkups on our check-ups" primarily keep our sanitation inspectors on their toes. This is wise, we believe, because they live so closely with the working conditions that they might become careless.

"Careless" did we say? Well, let us hasten to soften that thought—since actually our inspectors even carry out informal checkups to make certain that they are not caught napping.

For during their daily trips through the factory, they make it a practice to apprise one another of their observations. In this way, bad condi-

10th of 10 Cleanings Is Electrostatic





POPPING CORN gets final "go over" in this electrostatic cleaning unit. Grains are fed in thin, continuous layer from feed hopper (see drawing) across a chute that delivers particles to electrostatic field created by voltage potential between electrode and grounded chute. Separation is achieved at this point by difference in degree of repulsion from charged electrode. Least-repelled material—the corn—is isolated from most-repelled particles (impurities) by adjustable splitter. Corn continues by gravity feed to other chutes for exposure in additional separating zones, while impurities are conveyed from separator. The capacity of Cracker Jack's unit (right) is about 5,000 lb. hourly.

tions are corrected before even being officially reported.

Consultant's inspections takes a full day at all locations—plant as well as each storage facility. He issues reports to the Vice-President, along with findings and recommendations. Copies are also passed along to the inspectors. After 2 or 3 weeks (sufficient time to correct conditions cited by consultant), there is a meeting of the Vice-President and inspectors. Here, recommendations are reviewed to determine actions to be taken.

The consultant also keeps us on top of newest developments in insecticides, rodenticides, germicides, detergents, and sanitary procedures.

Now to the laboratory checkups:

Unique here is our system of microscope examinations of floor sweepings and unwanted accumulations in equipment and other facilities. Sought are possible extraneous matter or particles that might evidence insects, rodents, or mold spoilage.

Analyzed, for example, are cleanings from popcorn-elevator boots, corn pit, waste-corn elevator boot, and product conveyors, as well as sweepings throughout all processing and storage areas.

We also lab-examine incoming raw materials and out-going finished products. As a double-check on the laboratory, we have samples submitted monthly to an outside biological and chemical analytical firm. This checking is to pin down any possible presence of insects, larvae, skins, rodent hair, pellets, etc. (None of these, however, has been reported.)

To keep abreast of developments in the sanitation field, our chief chemist attends at least three sanitation seminars yearly, as well as other technical meetings where sanitation talks are featured.

As for checking incoming materials, thoroughness is our keynote. Popcorn is sampled by collecting 5-lb. amounts throughout each box car with a 6-ft. probe. Similar samples are gathered from tank-car shipments of sugar, syrup, and molasses.

Sanitation Meetings

Fourth phase of our program involves biannual meetings attended by all foremen and floor ladies:

Here, the Vice-president shows pictures of both ideal and undesirable conditions taken in and about the plant. Discussed, too, is the sanitation progress currently made and yet to be made, specific points "to keep the plant the cleanest you can," and importance of maintaining ship-shape order. Also stressed are simplified instructions by which new workers are advised what they must know and do to keep the plant a model of good sanitation.

Fifth, there is our regimented clean-up attack:

Working 'round-the-clock in groups are 25 men for all three shifts. They scrub floors, wash walls, clean stairways and rest rooms, with no stinting on soap, disinfectants, and water. Also, clean-up chores are facilitated through use of automatic scrubbing units and power-vacuuming machines.

Dust gets no opportunity to accumulate, because we have a built-in vacuum system in our popcorn-handling facilities, marshmallow-casting room, and packaging areas. Moreover, vac outlets are spotted nearby each marshmallow-depositing machine. And constantly, during two shifts, a pair of workers vacuuming dust accumulations.

Then, at the end of each work day, all equipment and other facilities are cleaned by operating personnel or clean up crew.

Looking Over Process Units

Now to the final part of the program — selection of sanitary equipment, facilities, and practices:

First, for considerations of equipment, a meeting is called attended by top management, chief engineer and chemist, purchasing agent, and factory superintendent.

The discussion then centers upon

(Turn to page 168)

Sanitation Rules for CJ Workers

The sanitary operation of a food plant requires the cooperation of all employees. Here are some of the more important employees' rules that must be observed—plain, common-sense rules. Employees must work to break all bad habits that violate these rules.

1. Every person handling food during processing must, at all times, be completely dressed in clean clothing, including an adequate headcover, and must keep hands and body clean.

2. An employee who is ill, or who has blemishes or breaks in the skin on hands or other parts of body, shall report to the supervisor before starting work.

3. After visiting washroom facilities, all employees must wash their hands with soap and water before returning to work. Signs have been placed in the toilet rooms as a reminder, and sufficient soap and towels are provided.

4. Use of any form of tobacco is prohibited in the plant, except in smoking areas.

5. Food materials that drop or spill on the floor, or otherwise become soiled or contaminated, must not be returned to production, but must be placed in a waste container.

6. Work areas and equipment must be kept clean during production hours.

7. Outsides of bags, boxes, or other shipping containers must be cleaned before dumping raw products into production. If this is not done, dirt and other forms of contamination, which may be on the surfaces of such packages, will contaminate products.

8. All containers from which food materials are used, must be kept tightly covered, except when in use. Everything must be covered when operations cease for a period of time, such as at night, or over week ends.

9. In carrying out their work, employees must:

(a) See that all raw materials are entirely free of signs of insect infestation or other contamination.

(b) Refrain from spitting in work areas.

(c) Keep doors closed and avoid making any building openings that are not properly screened or otherwise protected from entry of flies or rodents.

(d) Place waste material in waste containers.

(e) Always avoid climbing over open containers or processing machines, since this commonly causes dirt on the feet to contact them or fall into them.

(f) Be certain oldest raw material stock is used first—meanwhile checking each new container for possibilities of infestation or other contamination before using.

(g) See that broken packages of food material are not left lying around open in the plant. (Transfer such material into a sanitary package that can be completely closed.)

(h) Keep clothing lockers clean at all times, and if assigned special drawers or cabinets, clean them out frequently.

(i) Cooperate in keeping all objects away from walls, out of corners, and out of spaces under stairways.

(j) Think! Sanitation is in many ways just common sense, so think before acting and thus avoid any possible contamination of products.

Our company is proud of the sanitary conditions that exist in its plant. It does not simply want to sell a product in an attractive package, but wants to be sure that it is manufactured in a manner that the consumer will not hesitate to approve.

Our company hopes that each employee will likewise take pride in sanitation, and cooperate.

Should any employee observe anything in the plant which is not in compliance with what he believes to be good sanitation, he should report it.

Objective is to keep this preventive sanitation program at the highest level of effectiveness. And our criterion may be the frequent comment from among the 10,000 visitors who are annually shown through the plant: "This is one of the cleanest plants we have ever seen."

INFORMATION RACK on a main traffic aisle at Campbell plant stimulates employee interest in wide variety of subjects. This achieves effective communication reaching more than 80% of working force.

Racks of Good Reading Strengthen Worker Relations

Campbell's gives out attractive variety of publications that build employees' interest in "solid" information. And the plan proves excellent communications medium . . . Average American seen hungry for the truths that offset propaganda.

IVAN C. MILLER
Associate Editor, "Food Engineering"

Sometime ago, Campbell Soup Co., Camden, N. J., decided it had need for a special type of communications.

Basically, this need stemmed from a sharp realization of management executives: They were aware that other communications media, such as the monthly house organ, *Campbell People*, filled a considerable gap in the employees' knowledge of their company and its role in the national industrial picture. *But this service could be decidedly augmented by more adequate communications.*

Corollary with this view was the prospect of creating greater rapport with all employees. For this, in turn, would strengthen the general worker-relations structure.

In a comprehensive review of all related problems, a pioneer communications technique was decided on. Its aim was to bring to every employee a great variety of useful information on subjects such as basic economics, government, self-help, etc., which normally most employees would not find readily available.

At the same time, it was hoped that a greater mutual understanding could be established between the company and its employees, leading to better daily working relationships.

Chosen was the Information Rack Program — a means toward self-enlightenment through voluntary absorption of information.

Pays Off Handsomely

And today, after continuing check-ups and reviews, there is strong evidence that Campbell's action did result in getting "thar fustest with the mostest," and that the Program's expense has paid off handsomely in that valuable intangible—goodwill.

Employees appreciate information and self-help they can understand and use. The company, in turn, has benefited because it now has an indirect means of reaching and interesting employees in management's viewpoint.

Due to judicious selection of the reading material placed in the racks, the free booklet program has become a potent force in employer-employee communications.

Since there is no pressure placed on employees to take the booklets, and also since the booklets do not appear to be company originated, employee acceptance has been most gratifying. All pamphlets are published by a third party, hence are in no way identified with the company.

GET THE BEST CAR FOR YOUR MONEY
INVENTIONS WANTED
HAVE YOU EVER BEEN LONELY?
DO YOU USE YOUR HEAD?
ARGENTINA and MINNESOTA
HOME BUYER'S Check List

"SUBJECT MATTER was selected so that every employee would find something of interest each month."

MOST POPULAR THREE—with first choice "Our Constitution, presented in modern everyday language."

In fact, some of the periodicals placed in the racks are consumer publications seen on most newsstands.

The booklets cover a variety of subjects. To name just one: The economics of the American business system—factually presented to help build an understanding why the American business system is best and also to supply information to combat criticism of the system.

Topical matter was selected so that every employee would find something of interest each month. Thus, almost all employees now have the habit of taking not only booklets on their favorite subject but also others on topics that might not have interested them before, or which are of interest only to the folks at home.

Initial booklet service and the dispensing racks were purchased from the National Research Bureau, Inc., Chicago. Publication subject matter included in Campbell's monthly assortment is broken down below, along with the approximate percentages of distribution:

Type Subject	% Distribution
Home and Family	20
Inspirational and Self Help	19
Safety and Health	16
Mechanical and Technical	5
Social and Economic	23
Travel and Sports	6
Government	11

To the series of NRB pamphlets are now added supplementary publications. Some of these are obtained free from insurance companies.

In addition, publishers' overruns of some of the popular monthly magazines usually can be obtained for 5 to 6 c. per copy. The presence in the rack of these easily recognized newsstand publications removes from the rest of the offerings the suspicion of propaganda and "Company stuff."

Where They're Put

Aim has been to locate the racks strategically—so that each employee passes one rack every day. Areas are chosen (as safety regulations permit) in such places as corridors, locker rooms, cafeterias, and canteens.

The Personnel Department is responsible for the maintenance of the racks and for keeping them properly stacked with booklets. A supply of new and different booklets is put in them every ten days. Size of the rack and allotment of books in any location depends on the number of employees frequenting the area.

In general, the total of booklets made available in all racks ranges up to two-thirds the total number of employees.

If the supply of booklets in a rack is exhausted in a few days, readership is stimulated. Conversely, an accumulation in the racks of pamphlets that are ten days or more "old" lowers employee interest. So it is expedient to remove any booklets remaining after ten days (scarcity creates demand).

It is not expected that all employees will select any one pamphlet. For personal interests vary. However, there is evidence that the range of employee interests is enlarging.

A person who has customarily read just those booklets on one specific subject—say sports—begins to find in them information of such interest and value that he soon begins to pocket and read booklets on other subjects.

Although the full results of this program, which now has extended over several years, cannot be interpreted in terms of tangible savings, nevertheless some findings are measurable.

Checking the Score Sheet

Almost never is a booklet discarded inside the building or in the vicinity of the plant. This would indicate that most of the 245,000 booklets taken annually—a 98% pickup—are carried by the employees to their homes, where some at least are read and enjoyed by the families, too.

Some of the serial publications attract more interest than others. And employees who have somehow missed getting the current number of their favorite are quick to send in requests for copies. Others want additional copies. Also, if employees think a series that is popular with them is being dropped, they let it be known that they want it continued.

Handyman, a do-it-yourself magazine, is one such popular publication for which there are frequent requests. Others are all the various home-type booklets on such subjects as sewing, knitting, crocheting, etc.

Booklets and pamphlets devoted to government, the Constitution, flag displaying, and similar topics, are also high on the request list. As would be expected, those on sports, such as the annual baseball guide and schedule, are very much in demand, as are also the special-season booklets, such as those on Christmas carols, vacation tips, hints for workers who are retiring, and the like.

Further, the high requests for the special children's booklets, featuring stories, cut-outs, and coloring, strongly indicates the extent to which the interest in the free publications has penetrated the home.

It is not astonishing that baseball

Booklet Sources Used by Campbell

The National Research Bureau, Inc.
424 N. 3rd St., Burlington, Iowa

Robert F. Stone & Co.,
P. O. Box 88, Clayton 5, Mo.

Birk & Co., Publishers
270 Park Ave., New York City 17

Good Reading Rack Service, Inc.
76 9th Ave., New York City 11

Independent Economic Research Foundation
Hadlyme, Conn.

White & Arnold
1150 2nd Ave., New York City 21

Employee Information Service of National Assn. of Manufacturers
2 E. 48th St., New York City 17

The Economic Press
Montclair, N. J.

Channing L. Bete Co. Inc.
Greenfield, Mass.

Stevens Publications
139 E. 52nd St., New York City 22

Too Many Hands in Your Pockets!
SAY!
30%
HOW TAXES Affect Your Pocketbook
THE FOUR PILLARS OF FREEDOM
The New Changes in... YOUR SOCIAL SECURITY

THESE BOOKLETS "cover economics of American Business, combat criticism of system."

NEWSSTAND PUBLICATIONS. "Easily recognized, they remove suspicion of propaganda and 'Company stuff'."

"SPECIAL-SEASON BOOKLETS of Christmas carols, vacation tips, and the like, are much in demand."

Faith Today
A NEW LOOK AT VITAMINS
family AFFAIRS
75 ideas for better living
You Can be the Best Informed Person in Your Group
HOME MADE GIFTS

"SUPPLEMENTARY PUBLICATIONS were later added to initial offerings of National Research Bureau."

handbooks should be in demand—but it is both surprising and gratifying to find a great interest in the booklet titled *Understanding the New York Stock Exchange*.

However, the most popular booklet of all the hundreds offered has been *Our Constitution*, in modern printing and everyday language. Many months after the supply was exhausted, requests for this booklet were still coming in—"for Tommy to take to school" or "to send to my folks in Detroit," etc.

Ten Months' Checkup

When the information rack program had been in use just short of a year, with more than 150,000 pamphlets already distributed in the Camden plant, a preliminary checkup was made. This revealed that about 92% of all material racked had been taken by the employees.

The average circulation proved to run higher than three pamphlets per employee per month—better than had originally been hoped for.

These facts prompted an informal survey among permanent hourly employees chosen at random in the plant, with interviews made by the Personnel Department. And here, results confirmed the figures on booklet circulation—the findings proving acceptance to be excellent with probably less than 15% indifference to the project.

The indifference of this minor group is indicated by comments of a few of those interviewed, such as "Little time to read" or "Don't agree with everything." On the other hand, gratifying comments came from the majority, such as "Information very important — helpful," "Very good idea," "Lots of valuable information," "Always take them home."

Of those interviewed, less than 15% failed to take material from the racks regularly. And while 10% read the booklets only occasionally, only 5% never do. Furthermore, of those who take pamphlets, only 5% never take the material home.

Answers to one question relative to evaluation of the project were most revealing: Of those interviewed, fully 90% reported that most of their fellow employees viewed the booklet program favorable. The remaining 10% "just didn't know."

Of course there were those who are never satisfied, as indicated by such comments as these: "Make leaflets bigger," "More comic books," "More economics" (surprise!), and "Don't know whether to believe all of it."

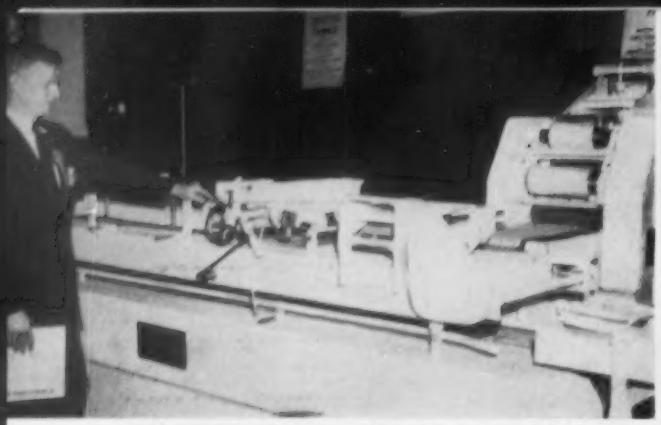
Approximately 95% stated that they gained something from the service, with these typical comments: "Very helpful to me," "Learn a great deal," "Teaches me to live better," "Learn many good pointers," "Gain a lot," "Learn much important information."

It was brought out in the survey that of the representative pamphlets shown to employees during the interviews, the group that included *Home and Family*, *Mechanical and Technical*, *How to Decorate Your Home*, and *Handyman* drew the most favorable reaction.

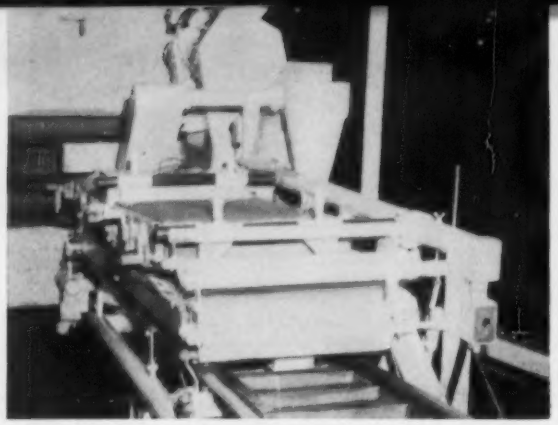
The next most popular—and this was somewhat of a surprise to all—was the group covering economics, with an unexpected high degree of interest in *Miracle of America*.

Incidentally, men find the booklets in the information rack more interesting and of more value than do women.

In selecting the various booklets, the Personnel Department has always taken care to assure that the material is entirely impartial in every way. The attitude of the union personnel, shop stewards, and union officers has established the acceptance of the program by this group—which proved to be more interested and better informed regarding the project than the rest of the employees interviewed.



CROSS-GRAIN molder panner designed to give superior grain, texture, shape to loaf, operates at 45 loaves per min. with one man. Open construction and easily rotated belt simplify cleaning and maintenance.—Lane Mfg. Co., Baltimore, Md. (82A)

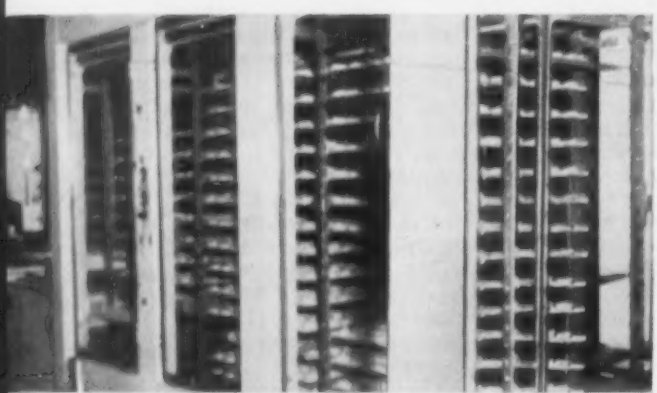


UNIVERSAL molder-panner employs 2-stage head for curling and sealing sheet at right angle to, or in line with direction of sheeting. Air-centering device guides dough piece, vacuum removes excess flour.—The Century Machine Co., Cincinnati. (82B)

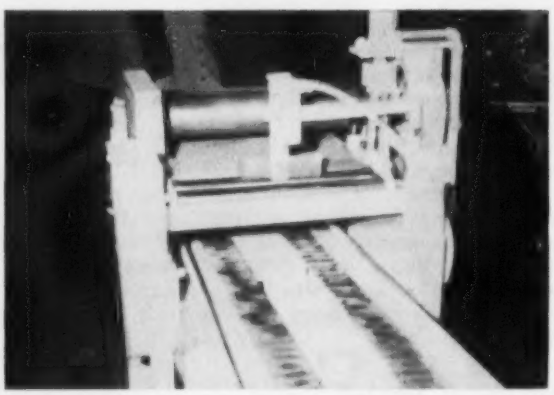
64 New Bakery Units

Demonstrate Design and Operation Advances at Bakers' Show: *Molding • Panning • Coating • Forming • Handling • Mixing • Whipping • Slicing • Wrapping • Baking • Vending*

8 MOLDERS, PANNERS AND PROOFERS



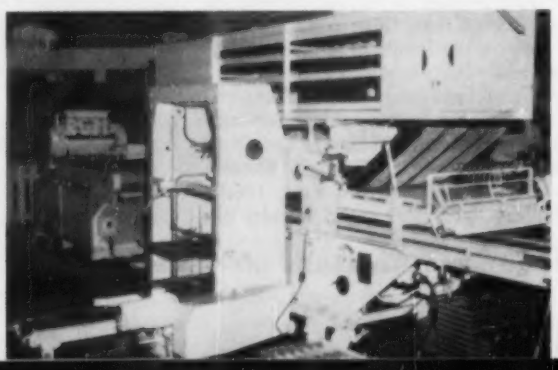
CONTROLLED-HUMIDITY sweet goods proofer has full-vision plastic doors, sanitary construction. Trayed product moves on compressed-air-driven chains.—Doughnut Corp., of America, New York. (82C)



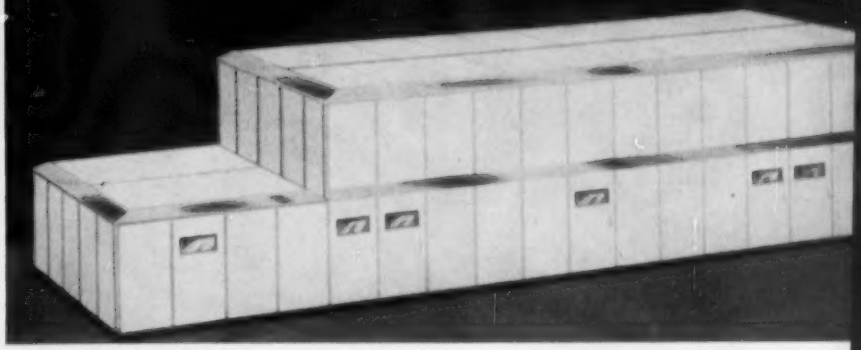
LABOR SAVING panner handles twist, twin, one-piece doughs at rate of 50 per min. Unit is built to fit any type and size molder. Said to save one to two men as against previous operations. — W. O. Sexauer Bakery Service, Dallas. (82D)

HEARTH MOLDER handles many types of dough in lengths to 18 in. Unit rates at 50 loaves, 100 rolls per min. —Wallace & Tiernan Inc., Belleville, N. J. (82E)

REDESIGNED proofer-panner favors low height. Buns shaped, extruded, positioned on robot-fed trays, then go through proofer.—Am. Mch. & Fdy. Co., New York. (82F)



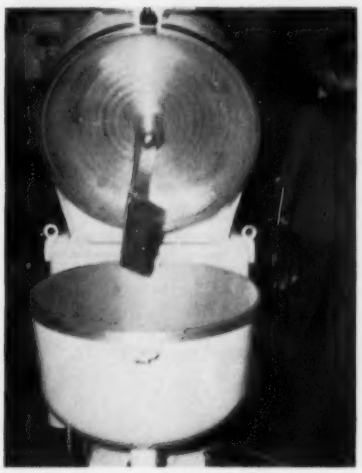
SWINGING PARTER for easy cleaning, flexible stop that prevents dough pieces from doubling up, feature new cross-grain molder-panner. — Read Standard Corp., York, Pa. (83A)



LIGHT-ANIMATED display of flexible proofing box that eliminates under- or over-proofing during changeovers. Auxiliary storage chamber enables one or more racks to be diverted from circuit, thus shortening exposure time of remaining ones. When returned to circuit proofing time is lengthened.—Read Standard Corp., York, Pa. (82B)

6 UNITS FOR MIXING AND WHIPPING

IMPROVED appearance, ease of cleaning feature new 80-qt. heavy-duty mixer. Has power bowl lift, timed operation, easy clutch, quick-acting clamps. — Hobart Mfg. Co., Troy, Ohio. (83C)

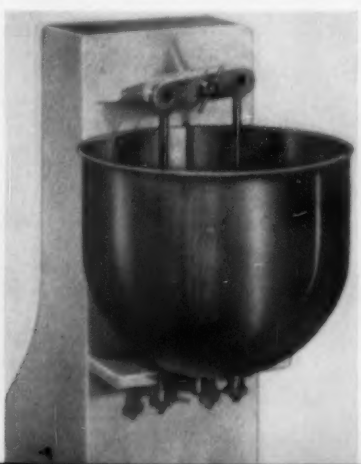


WP DOUGH MIXER is hermetically sealed during kneading, powered by drive in tilting head. Rubber-wheeled pan holds 165 lb. flour.—Distributor: National Equip. Corp., New York. (83D)

CONTINUOUS cake mixer converts pre-blended batter to desired density, texture for depositor. Capacities: 150-450, and 200-600 gph. Water-cooled head. — Baker Perkins, Saginaw, Mich. (83E)

AIR-WHIP attachment cuts cake mixing time, saves baking powder. Fits vertical bowls to 80-qt. Used for meringues, icings, creams, too.—Saylor Homogenizer Co., NYC (83F)

PORTABLE HOMOGENIZER handles cream fillings, whipped toppings at 120 qt. per hr. Pressures from 500-2,500 psi. automatically controlled.—C. W. Logeman Co., Brooklyn. (83G)



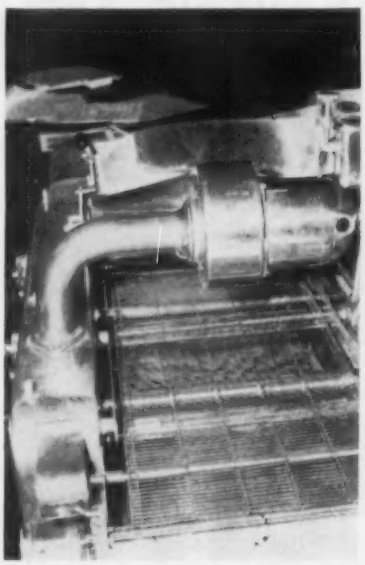
CREAM is whipped faster, to greater volume, firmer quality by air-unit that fits any 20-qt. mixer. Employs variable-speed ac.-dc. blower. — Homogenette, Inc., N. Arlington, N. J. (83H)

9 COATERS, FORMERS

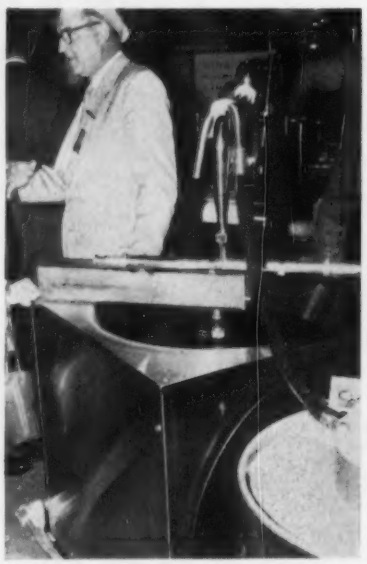
SIDES of round cakes are iced to desired thickness by two nozzles. Takes cakes 5-11 in. dia.—Basic Foods Sales Corp., Englewood, N. J. (84A)

GLAZER-ICER uses "curtain" of syrup, has hold-down belt to submerge cakes. Supply tank thermostatically controlled.—Joe Lowe Corp., New York. (84B)

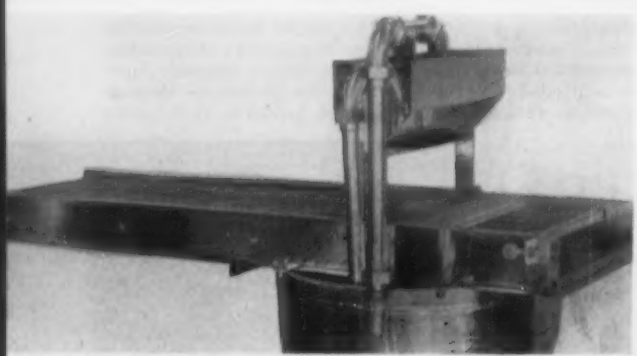
CAKES and doughnuts are coated continuously at high speed by unit featuring sanitation and speed of change-over.—J. W. Greer Co., Wilmington, Mass. (84C)



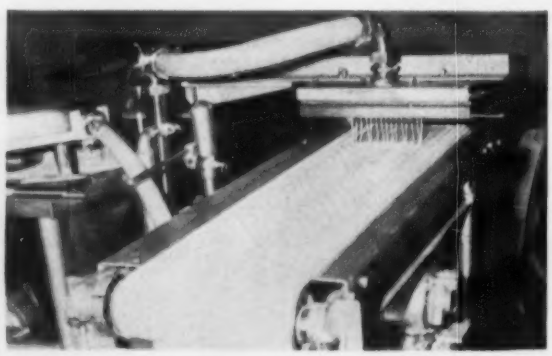
CHOCOLATE coater for full, bottom, and half coverage of wafers, discharges to paper sheets. Blower removes excess coating.—C. Tennant Sons & Co., New York. (84D)



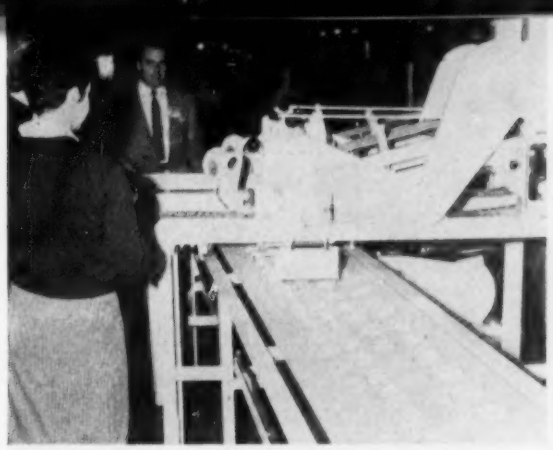
SWEET GOODS and cakes iced continuously by variable-speed depositor having water-jacketed open-bowl for easy filling. — Mallet & Co., Pittsburgh. (84E)



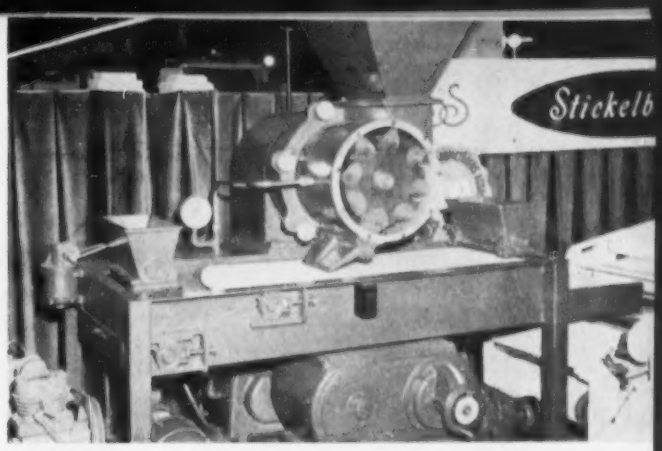
PORTABLE enrober and icer handles 400-500 doz. units per hr. Water-jacketed kettle has frame-type agitator with Teflon scrapers. Conveyor easily removed from kettle.—En-ro-bo, Inc., Chicago. (84F)



ICING machine for cakes and sweet goods features interchangeable slide-in dies for fast change-over from sheet to ribbon. Head adjustable over 14-in. range.—American Breddo Corp., New York. (84G)



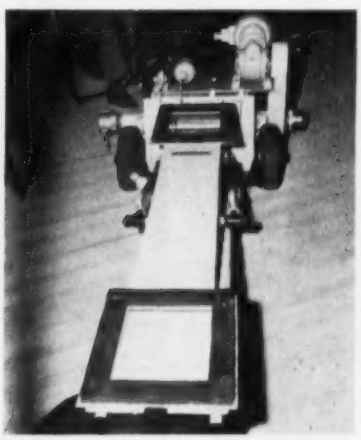
INTERCHANGEABLE heads enable production of 'penny', 'beer' or standard (thin-unit size) pretzels on this machine.—American Mch. & Fdy. Co., New York. (85A)



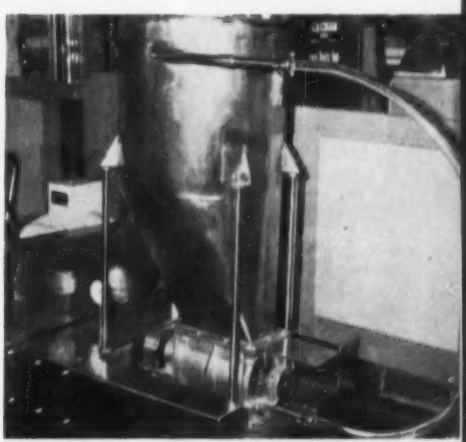
EXTRUDER for different shape sweet goods employs vacuum in rotary chamber to prevent air-dough mixing.—Stickelber & Son, Inc., Kansas City, Kan. (85B)

4 FLOUR HANDLERS AND 2 STARCH DUSTERS

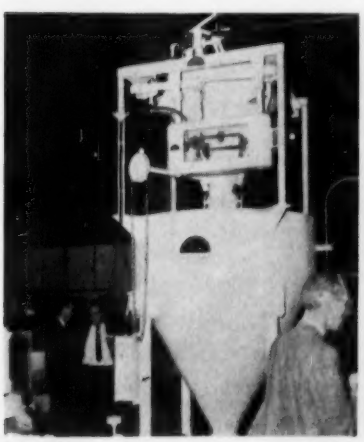
SOLIDS are fluidized, moved up to 200 ft. through regular pipe by low-pressure air. Special filter eliminates cyclone.—Fred D. Pfening, Columbus. (85C)



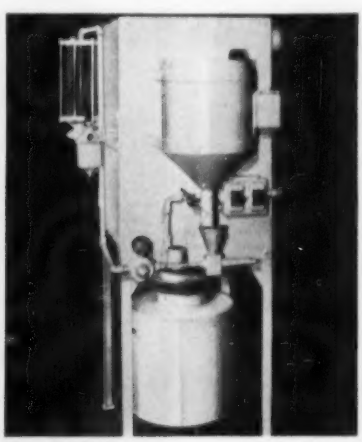
FLOUR transfer unit enables easy unloading from Airslide cars to bulk vans or to storage. Capacity 15 tons per hr.—Fuller Co., Catasauqua, Pa. (85D)



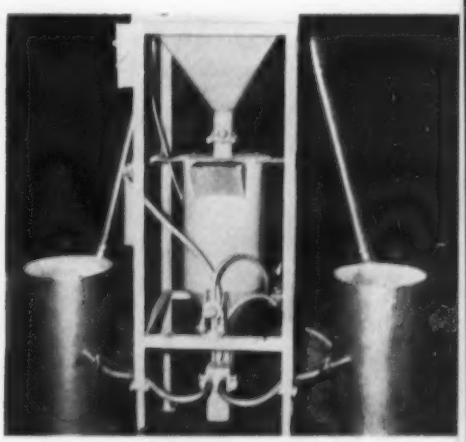
EFFICIENT conveyor suspends material in high-velocity air under negative pressure. Lack of moving parts cuts friction. — Sprout-Waldron, Muncy, Pa. (85E)



FLOUR (up to 175 lb./min.) is air-conveyed through sanitary tubing by combined fluidizing-pressure. — J. H. Day Co., Cincinnati. (85F)



CRAIG starch duster cuts handling time, pneumatically dusts pieces in chamber, recovers starch for reuse.—E. A. Bergholtz Co., New York. (85G)



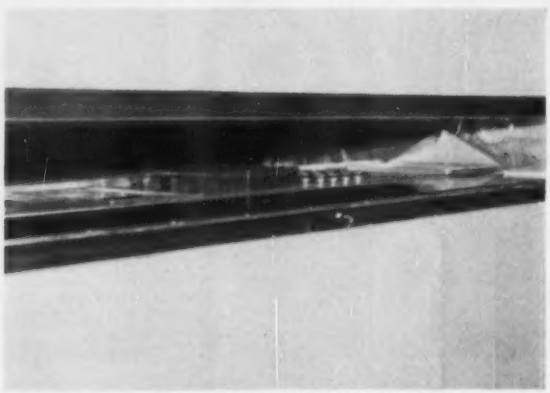
PNEUMATIC DUSTER efficiently collects starch for reuse without sifting in 156 sq. ft. filter area.—Sullivan Dry Spray Co., Inc., New York. (85H)

Turn page for more units →

NEW-TYPE stabilized traveling trays that move in pattern for most efficient heat and moisture exposure feature Cyclothermotron oven. Self-loading, automatic unloading are integral features. Capacities: 2,000-6,000 lb. per hr. Choice of external colors and 1-, 2-, 3-tone combinations.—Haller Oven Co., Pittsburgh. (86A)

3 OVENS AND 2 BREAD VENDERS

TRAVELING-TRAY OVEN has portable, automatic loader and unloader, stabilized trays, electronic variable-speed drive. Start, stop, reverse switches in center of front panel. Controls in master panel.—Century Machine Co., Cincinnati. (86B)

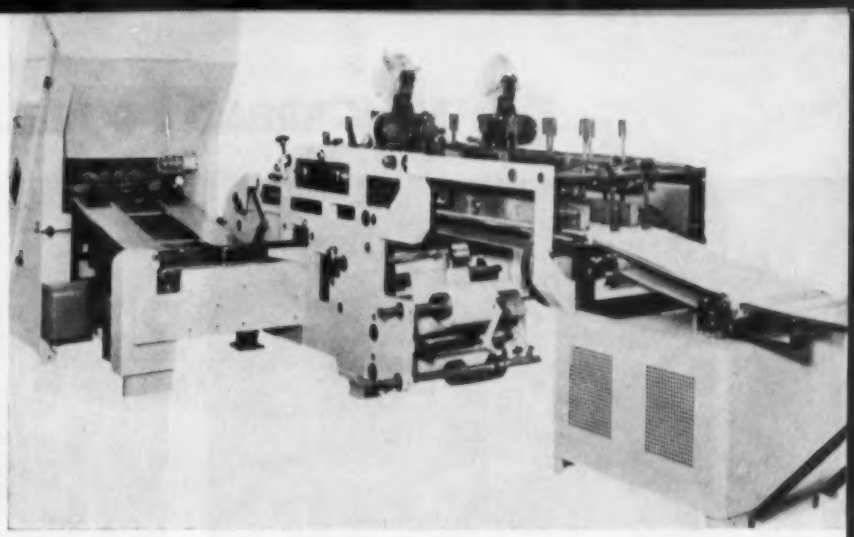


REVOLVING-TRAY OVEN features crack-proof reels, tip-proof trays, automatic self-adjusting tray arms, positive gear drive. Colored porcelain, enamel or stainless finishes. Sizes: 8 ft. 10 in.x7 ft., to 17 ft. 7 in.x12 ft.—Middleby-Marshall Oven Co., Chicago. (86C)

VARIOUS-PRICED baked goods are dispensed from vending machine equipped with automatic change-maker. Unit heated. Products visible through glass panel.—Stallworth Variety Vending Machine Corp., Easton, Pa. (86D)

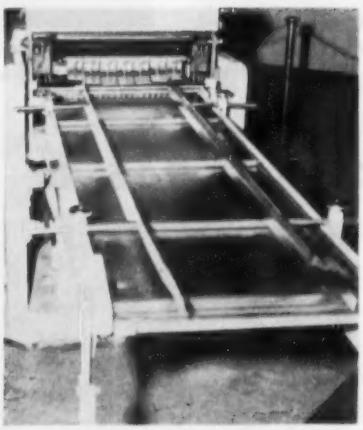
BREAD VENDER handles from one to three varieties, also rolls and cakes, holds 72 loaves. Used indoors or out. Latter may be heated.—Peterson Oven Co., Franklin Park, Ill. (86E)

3 WRAPPERS
5 SLICERS

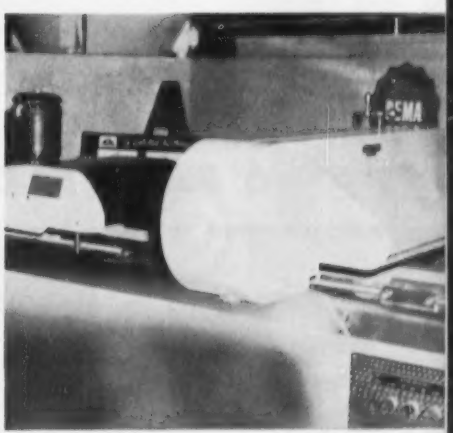


HIGH-SPEED—up to 75 loaves per min.—slicer-wrapper combination incorporates block feeding cutter for maximum production, electro-mechanical flow control to separate loaves after slicing. Handles all types of heat-sealing materials, employs conventional and curved plate plus flexible fingers to insure perfect seal. New Roller-Hold eliminates wear and backlash.—Package Machinery Co., E. Longmeadow, Mass. (87A)

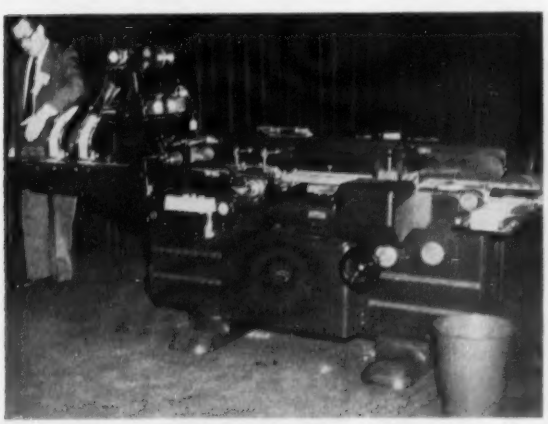
ROTARY cutting attachment for existing reciprocating machines cuts both sponge and sweet goods at band speeds up to 200 ft. per minute. Weighs only 300 lb. Readily adaptable to any make machine.—J. W. Greer Co., Wilmington, Mass. (87B)



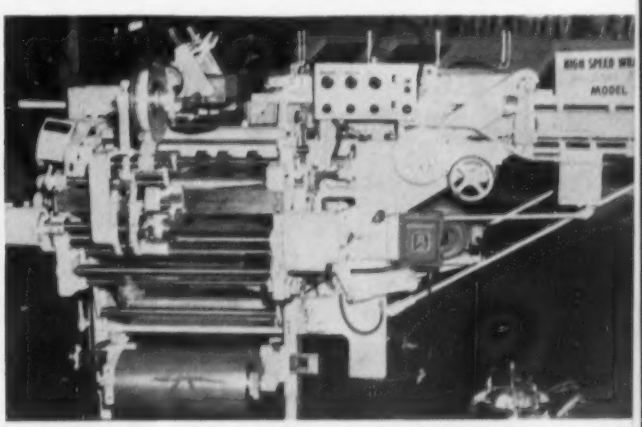
STRAIGHT-THROUGH feed, heavy duty reciprocating knife slicer for raisin and heavy breads handles 7-16 in. loaves. Has automatic indexing and hold-back mechanism on infeed conveyor.—Maine Machine Works, Los Angeles. (87C)



COMBINATION roll and twin slicer permits slicing single rolls in pans, cluster rolls in or out of pan, and double decker rolls completely through four across. Handles more than 300 packages per hr.—Alto Corp., York, Pa. (87D)



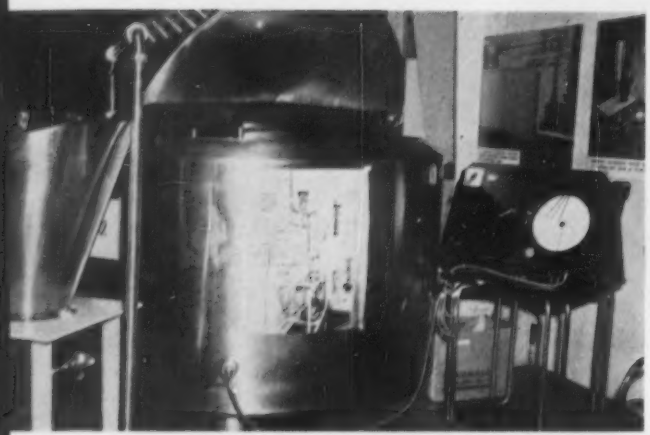
VERSATILE wrapping machine handles cream-filled cakes, pies, crackers at high speed without damage. Uses all type packaging materials. Code daters, card cutters, automatic feed and delivery attachments optional.—Hudson Sharp Machine Co., Green Bay, Wis. (87E)

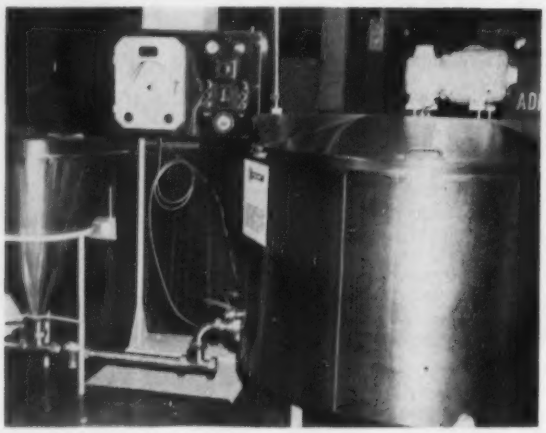


STRAIGHT-LINE wrapper seals hamburger buns, rolls (hot-dog, iced cinnamon, Parker House, brown 'n serve), and round cakes in show-case packages at speeds up to 70 per min. with one operator.—Battle Creek Packaging Machine, Inc., Battle Creek, Mich. (87F)

Turn page for more units →

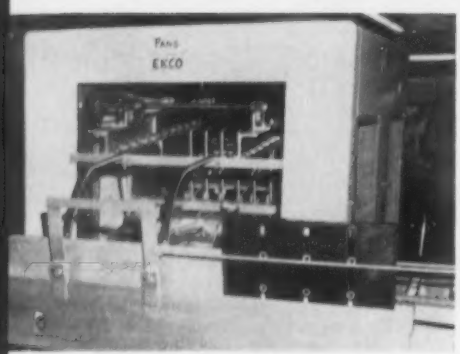
2 NEW BREAD PROCESSORS



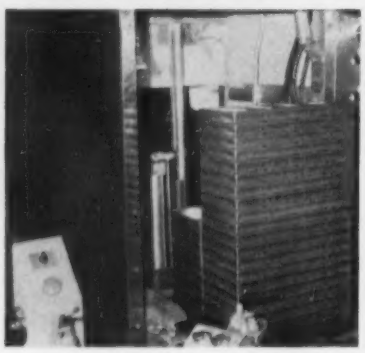


STABLE FERMENT UNITS eliminate setting of individual sponges, save floor space, cut processing time. Equipment includes dry-ingredient hopper, sanitary pump and piping, mixing tank, and automatic controls. Left: Creamery Package Mfg. Co., Chicago. (88A). Right: Cherry-Burrell Corp., Chicago. (88B)

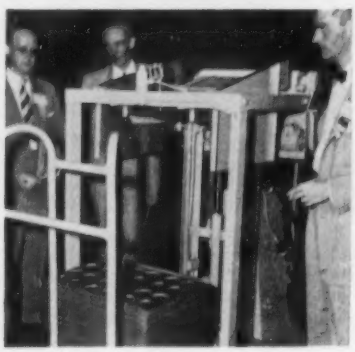
6 PAN STACKERS, GREASERS, AND DUMPER



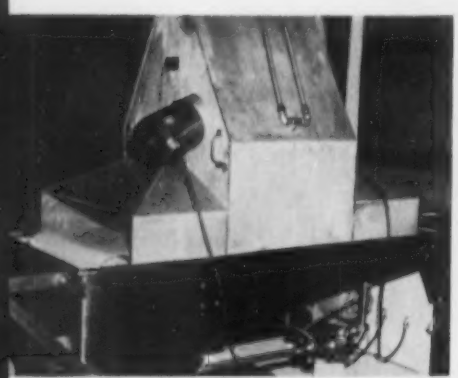
DE-PANNER, de-lidder removes lid, inverts pan, deposits loaf on stainless chute that rights loaf.—Latendorf Conveying Corp., Bayonne, N. J. (88C)



PANS are stacked and stored on conveyor then fed to production lines as needed by new stacker and release.—The Peterson Oven Co., Franklin Park, Ill. (88D)

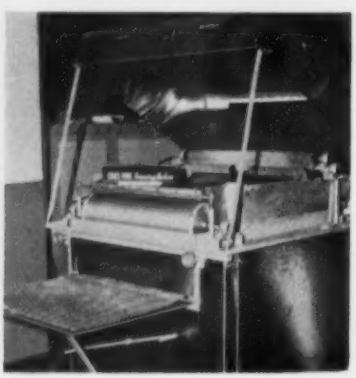


BUN-PAN STACKER groups 100 or more pans, deposits stack on truck, and then ejects truck from unit.—Velden & Pulver, Inc., Chicago Ridge, Ill. (88E)



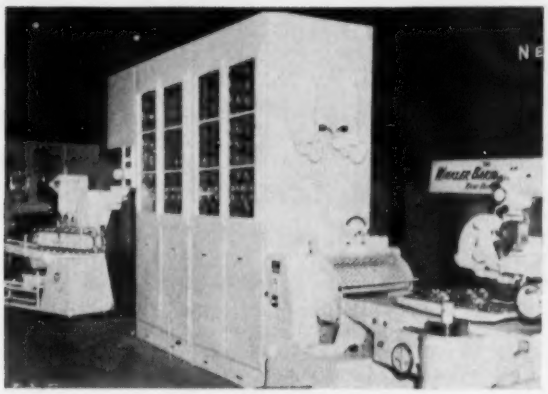
GREASER for flat or cake pans employs two spinning disks. Variable-speed conveyor controls coating thickness.—Bauer Machine Co., Mineola, N. Y. (88F)

CAKE PANS greased at speeds of fastest depositors in coater with 16-in. rotating disks, quick-change templates.—J. H. Day Co., Cincinnati. (88G)

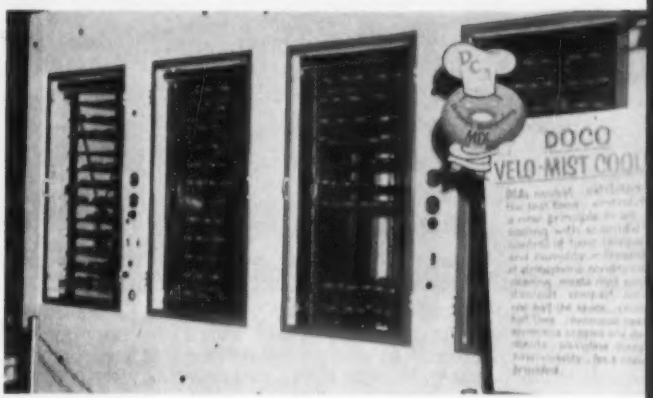


NON-CLOGGING pan-greaser spreads oil or grease on revolving wire screen, then air jets blow it into cake or bread pans.—Dukay Machine Co., New York. (88H)

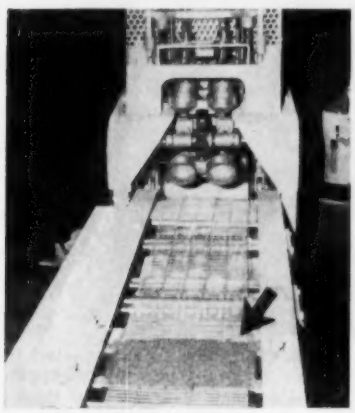
16 OTHER BAKING INNOVATIONS



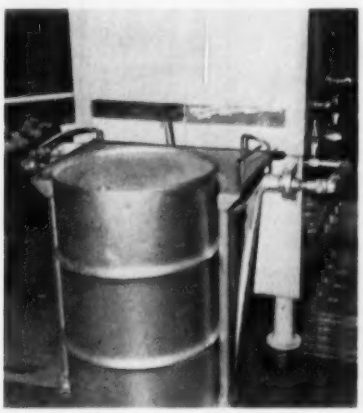
AUTOMATIC roll line comprises divider and rounder (right), proofing cabinet (center), former-seeder (rear). System will handle up to 700 doz. per hr.—Winkler Baking Machine Co., New York . (89A)



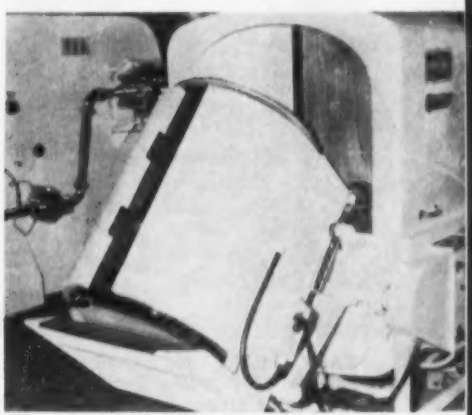
ADJUSTABLE cooling period and air-driven chain elevators are features of this cabinet. Limit switches govern tray transfer between sections. Moisture loss minimized. —Doughnut Corp., New York. (89B)



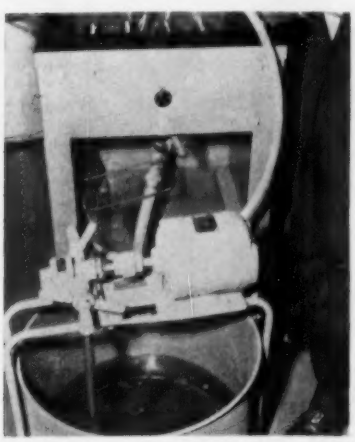
SEEDER (arrow) uses spray to dampen rolls. Seeds feed to flat plate, rolls pass over on wire belt. Hopper is removable.—F. M. Stewart, Philadelphia. (89C)



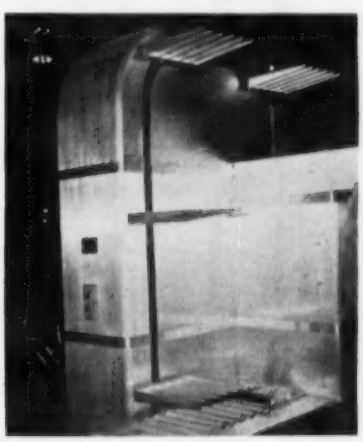
SHORTENING is completely, easily removed from drums, then liquefied by steam-jacketed holder-inverter, steam heated melter.—Read Standard Corp., York, Pa. (89D)



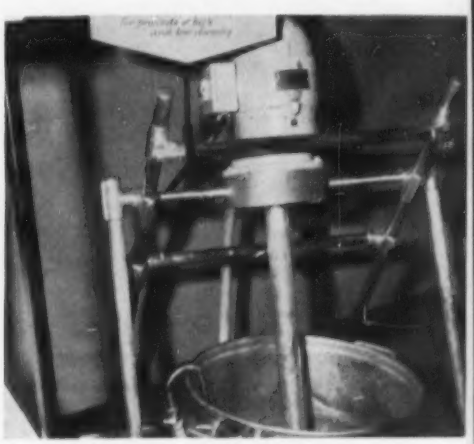
HANDLING system for shortening employs electrically-heated drum dumping carriage, electric or steam heated holding tank.—Baker Perkins, Saginaw, Mich. (89E)



SIMPLE operation, cleaning, reassembly are features of fat filter, fryer washer: Sparkler Mfg. Co., Mundelein, Ill. (89F)



ELEVATOR-LOWERATOR picks up products from roller conveyor discharges them at any height.—Baker Perkins, Saginaw, Mich. (89G)



SANITARY transfer pump for icings, oils, etc., is electric-powered, acts without air.—Mallet & Co., Inc., Pittsburgh. (89H)

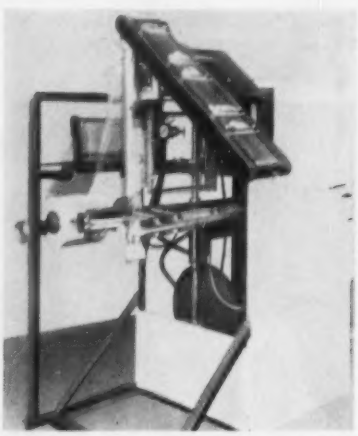
Turn page for more units →

ANIMATED FLOW-CHART displays features of continuous dough mixing system now under development. Design is said to give greater efficiency to bread production.—Amer. Machine & Fdy. Co., New York. (90A)

CONTINUOUS food freezer employing Union Steel conveyors, York refrigeration was shown pictorially. Box is made of 6-in. Styrofoam laminated to Fiberglas.—Union Steel Products Co., Albion, Mich. (90B)

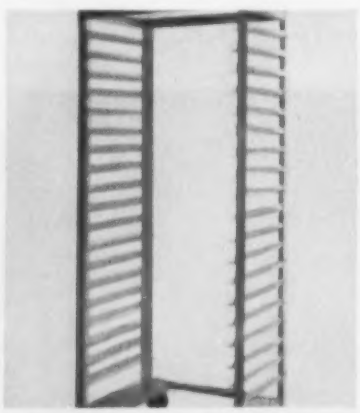
TART molder for small bakers handles 1500 pieces per hr. Unit forms, fills at same time.—Excelsior Eng. Co., New York. (90C)

OSCILLATING spray eliminates dead spots in rack washer equipped with automatic cycle timer.—Alvey-Ferguson Co., Cincinnati. (90D)



PRETZELS, rolls, etc. are packed in film at 30-50 per min. by Verti-Pak unit.—Mercury Heat Sealing Equip. Corp., Philadelphia. (90E)

FLUIDIZER moves flour (50-1000 lb./min.) 200 ft. with low-pressure air; unlimited distance with multi-units.—Superior Separator Co., Hopkins, Minn. (90F)

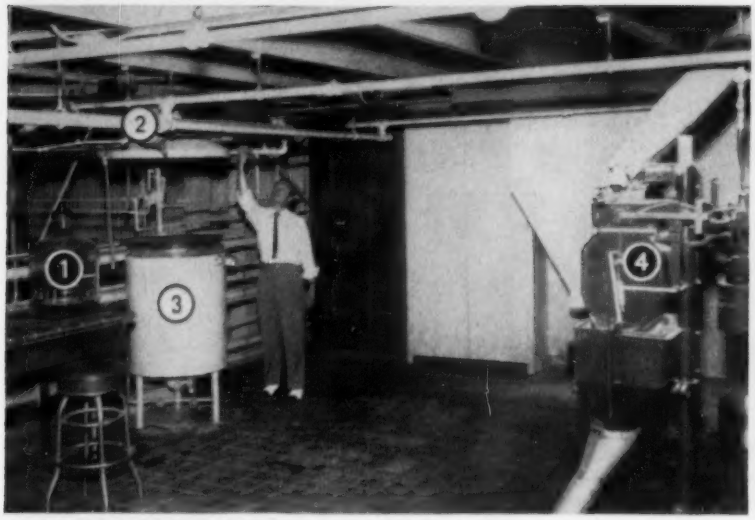


OPEN-RACK of aluminum alloy has easy-rolling, rubber-tired casters. Also available as "do-it-yourself" kit. —Bucks Co. Enterprises, Quakertown, Pa. (90G)

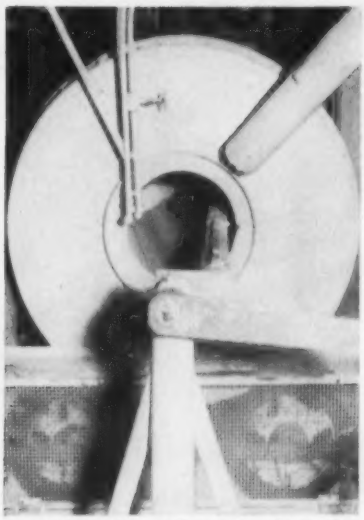
KAISER roll machine, has automatic feeder, seeder, uniformly molds 1¼ to 2 2/3 oz. dough pieces, 106 per min.—Henry Laber & Assoc., New York. (90H)

For More Details, Circle Key Numbers on Readers' Service Card

Highlights In Fortifying Process *Turn Page→*



A **FORMULATING:** Vitamin solution (delivered from mix-tank on floor above) is measured in bottle(1), then alcohol is heated (2) and mixed (3) with powders to form a coating solution. Rice is auto-weighed (4), then chuted to trumbol below, where solutions are added.



B **APPLYING:** Two pipe lines dispense solutions over rice as it revolves in trumbol. Grilling protects operators.

Seals Enriching Additives On White Rice

Special technique of enrobing grain premix with fortifying solution solves problem of restoring B_1, niacin, and iron—with precise proportioning to required levels . . . System engineered "from scratch." Sanitation and safety features included

R. R. MICKUS
Manager, Research & Promotion
Rice Growers Assn. of California, Sacramento

Actually, expediency sired our vitamin-mineral rice fortification process.

But it was engineering that made it economically feasible and efficient. And demonstrating this is our specific technique for enriching the white-milled grain to meet special nutritional demands.

Briefly, our process follows the method in which white-milled grains are wet down with thiamin and niacin in acid solution, and dried.* Then, an alcoholic solution of fatty acid (stearic), corn protein, and abietic acid (wood resin) is applied.

Finally, before the sticky grains dry, they are dusted with an iron-talc mixture. This product is the concentrate, or premix, which is later blended with white-milled rice.

So highly fortified is this concentrate that 1 lb. mixed with 199 lb. of milled rice, brings the final product up to requirements.

Although minimum vitamin-mineral levels are stipulated by the requirements in question (see accompanying author's panel), a safety factor was deemed advisable. Vitamin B_1 can lose potency during long storage of premix or fortified rice, and, also, on

* Procedure developed by Furter, M. F. *et al.* (*Industrial and Engineering Chemistry*, 38, 486, 1946). Patents on the basic process are held by Hoffman-La Roche Co., and plant operations are under a non-exclusive license and on a royalty-free basis. Further, this company assisted in plant design.

"It Became Imperative—

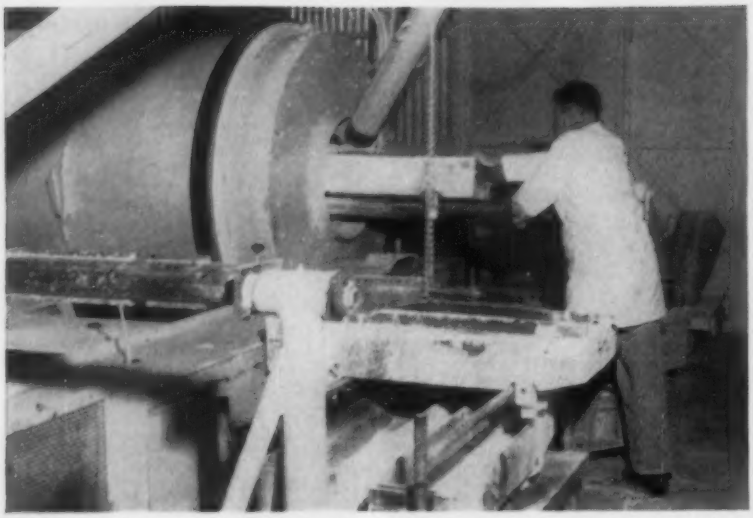
as well as expedient, to target fortification when, some four years ago, Puerto Rico passed Act. No. 430 stipulating minimum vitamin-mineral levels for milled white, parboiled, or whole rice —not less than 2 mg. of B_1, 16 mg. of niacin, and 13 mg. of iron per pound.

"For we have a stake in this specific market of some 100,000,000 lb. of white-milled rice annually.

"In particular, it was required that the rice should not lose more than 15% of these vitamin-mineral values when it is washed in cold water according to conventional procedure.

"Consequently, the added nutrients had to be sealed to the grains—as now accomplished by our enrobing-solution method."

—R.R.M.



C COATING: After addition of vitamins, half of coating solution is applied. Next, cars with iron-talc mixture are rolled into trumbol and dumped by crank. Then operation is repeated.

D SCREENING: Being sticky, solutions create rice clumps. These are removed by Rotex screens.

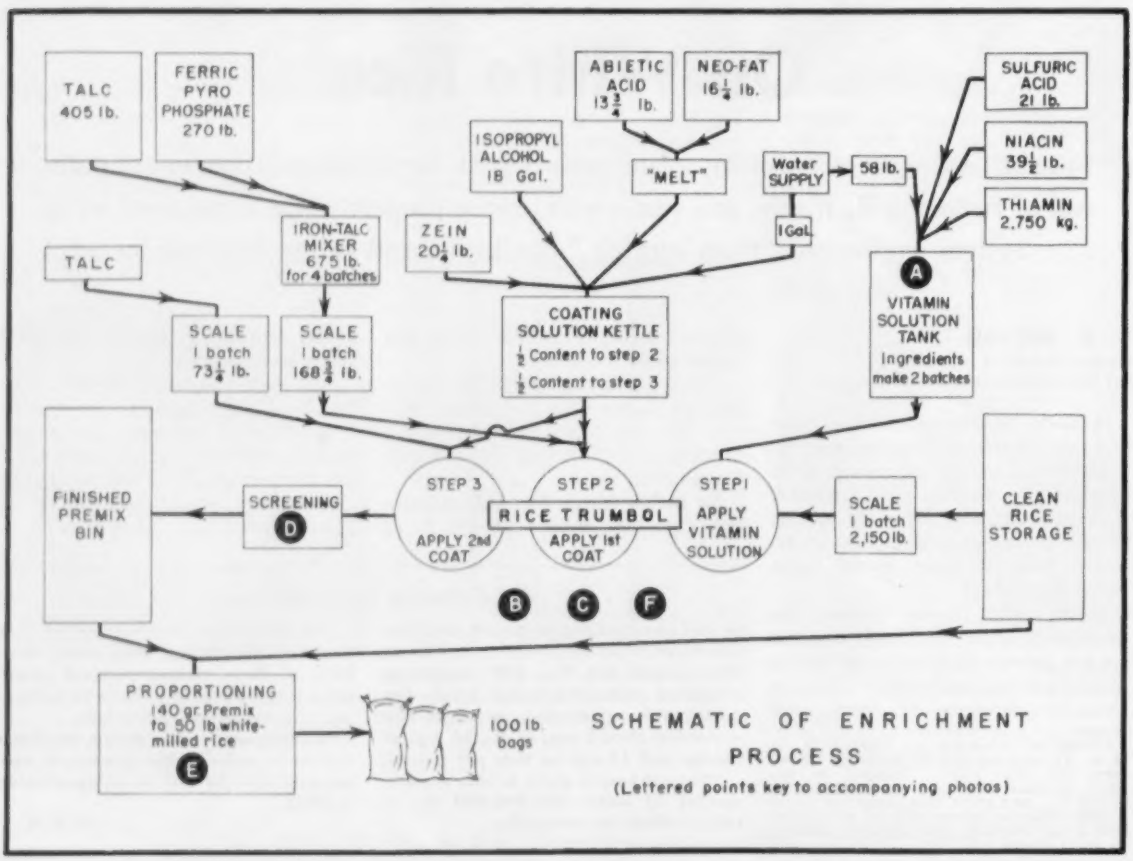
prolonged cooking of enriched rice in water containing certain mineral salts. Therefore, our enriched premix has this guaranteed-per-pound content:

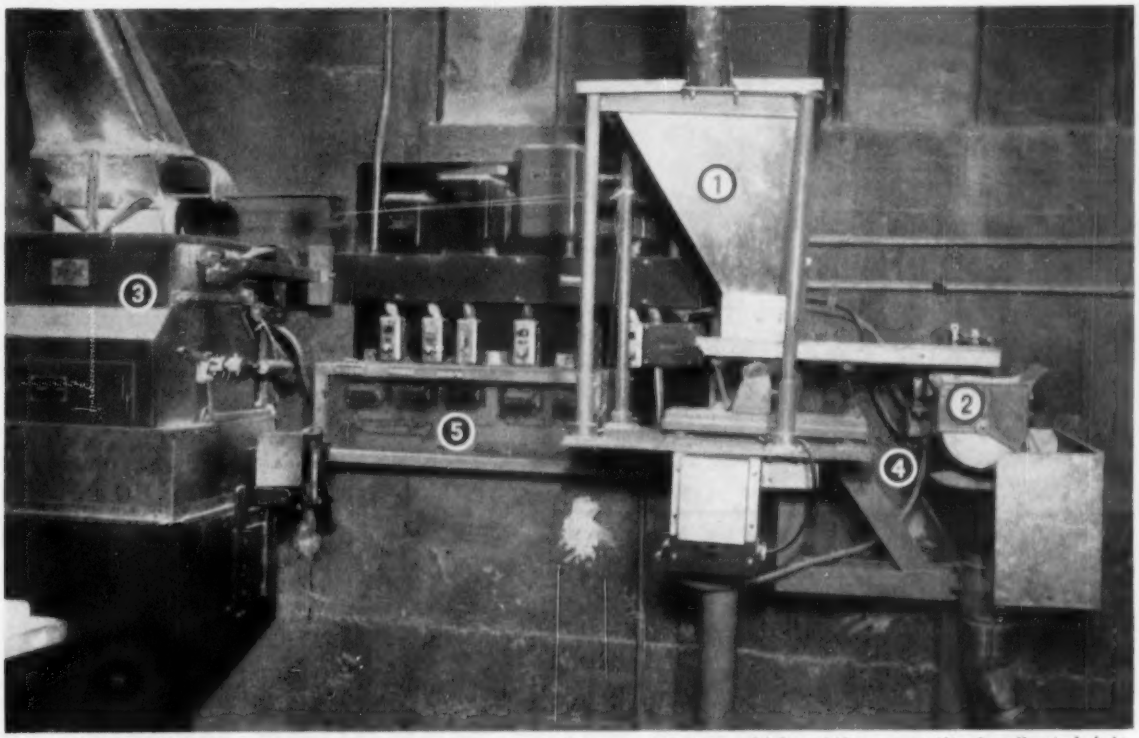
Vitamin B_1	440 mg
Niacin	3,200 mg
Iron	2,600 mg

To insure these levels it is necessary to use somewhat higher quantities in order to offset certain manufacturing losses that occur in both mechanical and chemical processes.

In formulating the dusting powder, sufficient talc and ferric pyro phosphate are mixed to coat four batches of rice (see flow diagram). But the sticky coating solution (which poses a handling problem) is made up in a quantity sufficient for just a single batch of rice. Then, to save time, enough vitamin solution for two batches of rice is prepared. Coating takes place in a trumbol*—a slightly inclined drum fitted with lengthwise

**Unit variously designated "trombol", "trumble", "trommel".


TALC 405 lb.
FERRIC PYRO PHOSPHATE 270 lb.
ABIETIC ACID 13¾ lb.
NEO-FAT 16¼ lb.
SULFURIC ACID 21 lb.
ISOPROPYL ALCOHOL 18 Gal.
"MELT"
Water SUPPLY
58 lb.
NIACIN 39½ lb.
THIAMIN 2,750 kg.
1 Gal.
IRON-TALC MIXER 675 lb. for 4 batches
ZEIN 20¼ lb.
TALC
A
VITAMIN SOLUTION TANK Ingredients make 2 batches
SCALE 1 batch 73¼ lb.
SCALE 1 batch 168¾ lb.
COATING SOLUTION KETTLE ½ Content to step 2 ½ Content to step 3
FINISHED PREMIX BIN
SCREENING D
STEP 3 APPLY 2nd COAT
STEP 2 RICE TRUMBOL APPLY 1st COAT
STEP 1 APPLY VITAMIN SOLUTION
SCALE 1 batch 2,150 lb.
CLEAN RICE STORAGE
B C F
PROPORTIONING 140 gr Premix to 90 lb white-milled rice E
100 lb bags
SCHEMATIC OF ENRICHMENT PROCESS
(Lettered points key to accompanying photos)



E PROPORTIONING: Concentrate is chuted to weigher hopper (1) from which a 140-gr. quantity is vibrated into 4-pocket, cylindrical dump (2). Depressed scale arm stops vibrator feed. Milled rice (50 lb.) is auto-weighed at (3). This load closes circuit that unlatches concentrate dump. Discharge of the 140 gr. past an electric eye (4) closes circuit to dump the 50-lb lot. Concentrate and milled rice then blend in a single chute. Automatic units count scale dumpings (5). Any mechanical failure actuates visual-audible alarm.

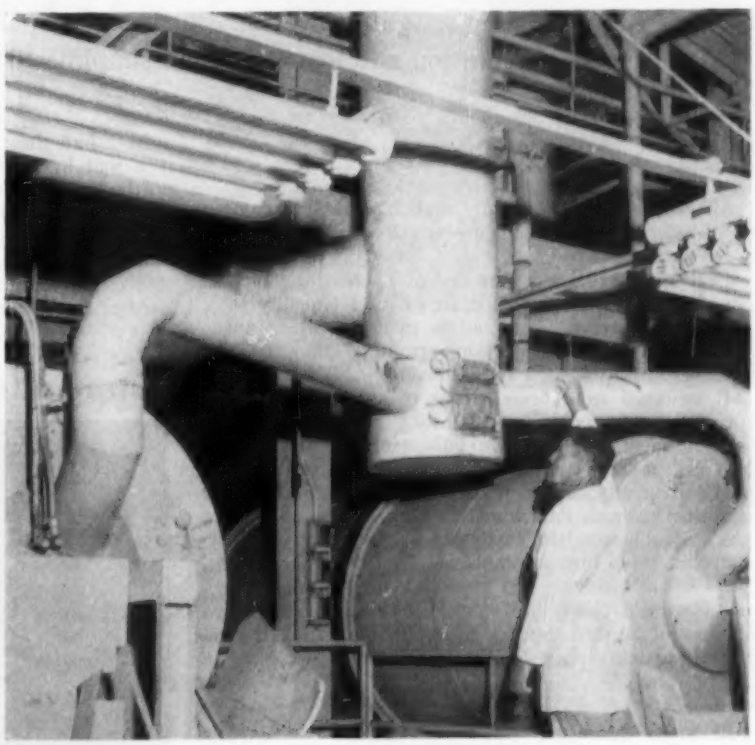
baffles. And, while trumboling the vitamin-mineral-coating materials, the operator formulates coating for the second.

Mechanical Application

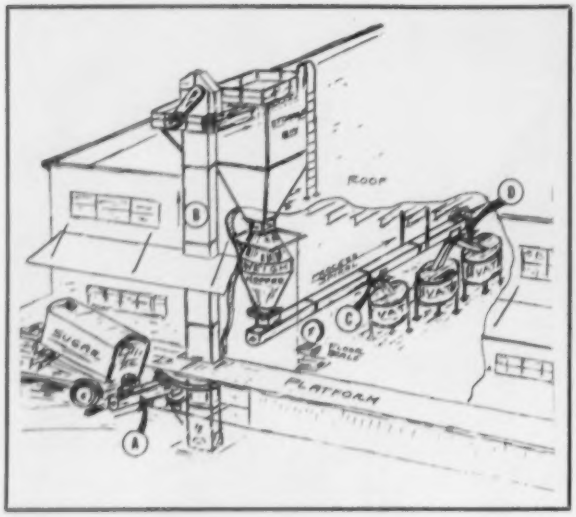
Premix is made in 2,500 lb. batches, of which rice comprises 2,150 lb. and the vitamin-mineral-coating materials 350 lb. Process is made continuous by alternately using two mixing trumbols.

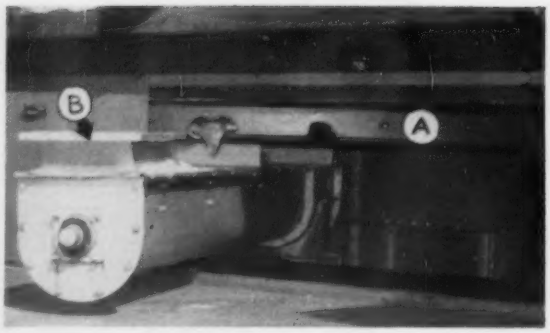
Solutions are piped to the machines by two separate lines, one of which is made of stainless steel for the corrosive vitamin mixture. These lines feed to perforated pipes that run the full length of the units. Solutions are gravity fed and drip from perforations. Also, the system has a compressed-air device for blowing pipes clear after use.

Rpm. of trumbols, which have both forward and reverse drives, may be adjusted to required speeds. After a 2,150 lb. charge is chuted to a unit, speed is adjusted to 12 rpm. Then vitamin solution, volumetrically measured from a bottle on floor above, is valved to the rice. When the bottle is empty, the line is blown clear with compressed air. It requires about 10 min. for thor- (*Turn to page 160*)



F SAFETY: Alcohol vapors from trumbols are exhausted by a fan on roof. Two manometers register air cfm., which is controlled by dampers (being adjusted by operator) to limit loss of powder. Further, all lighting in the sanitary layout is explosion-proof.





←**TRACING** flow of bulk sugar: From truck it goes via spiral conveyor (A) to bucket elevator (B), then into roof storage bin. Weigh hopper speeds scaled batches to process by spiral conveyor (C) and tap-offs (D).

CLOSEUP of spiral conveyor, pivoted out from under platform into truck-unloading position. It swings on circular monorail (A). Inlet hopper (B) connects with truck gate. After unloading, unit swings back.

Small Plant's *Big* Engineering

Pays Handsome Bulk-Handling Profit

Progressive preserver cuts costs, boosts production with specially designed sugar moving-weighing system. Further, company's advanced instrumentation automates process, simplifies quality control

LEONARD TRAUBERMAN
Assistant Editor, "Food Engineering"

Major engineering certainly makes plenty of sense in the small-to-medium company—which can benefit most notably from it.

In demonstration, take the case of Theresa Friedman & Sons, Inc., of Philadelphia, processor of top-quality jams, jellies, and preserves. Here, astute management has made impressive gains in production, operating efficiency, and quality control—through three moves.

It switched from open kettles to vacuum pans, thus speeding batch cooking and boosting product quality.

It installed an automatic bulk-sugar handling system that has cut costs, batching time, and storage requirements.

It put quality control right on the production line by adopting instream refractometers (FE Sept. p. 68), which give instantaneous Brix readings during cooking.

Processing is further simplified by a somewhat unusual plant layout involving two levels of operation, one several feet above the other, on a single floor. This permits gravity flow of finished product from holding kettles to filler. Processing takes place on the upper level; packaging on the lower.

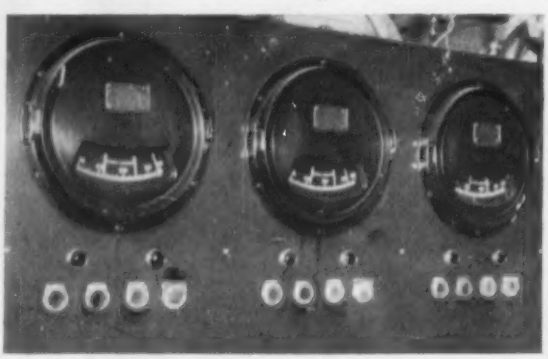
Bulk-Sugar Conveyors

To get the overall picture, we will first consider the action of the automatic sugar-handling system, specially designed for small-plant use.

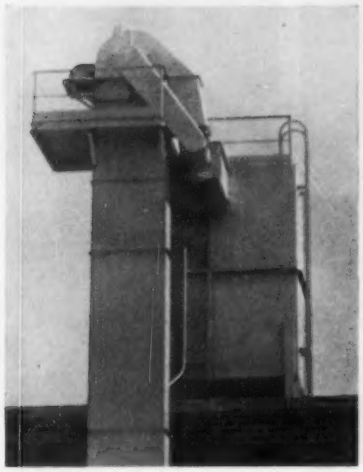
As a bulk-sugar truck backs up to the plant platform, it is met by a stow-away spiral conveyor, which swings out by monorail from beneath the dock. Then the truck gate is connected with the conveyor's inlet hopper to discharge the sugar into a 42-ft.-long bucket elevator. Latter delivers into a 50,000-lb.-capacity, cork-insulated storage bin on the roof.

After truck is unloaded, the conveyor pivots back into

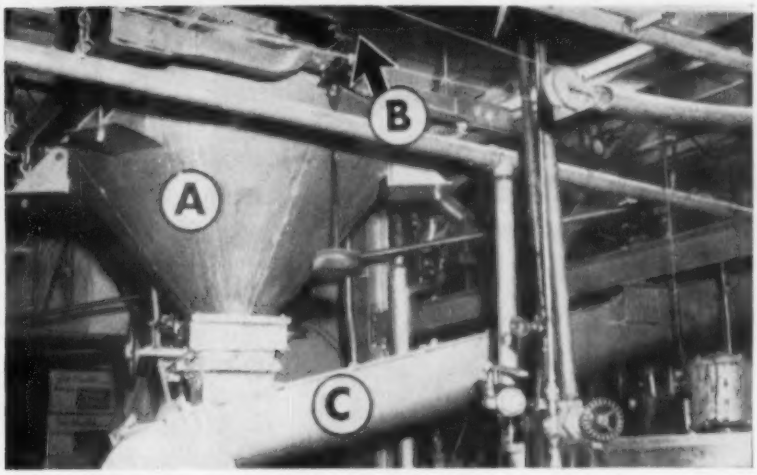
Instruments Are Major Factor . . .



TEMPERATURE CONTROLLERS regulate pasteurization of finished goods in jacketed kettles. Red light signals end of cook, and steam is cut off automatically.



ATOP ROOF, sugar discharges into 50,000-lb.-capacity, cork-insulated bin. Rate: 1,200 lb./min.



WEIGH HOPPER (A), directly below bin inside plant, receives sugar via motorized feeder. Automatic beam scale (B) links down to photocell-operated floor scale. Hopper discharges to spiral conveyor (C).

stow-away position. Unloading time for 24,000 lb. of sugar is but 20 min.

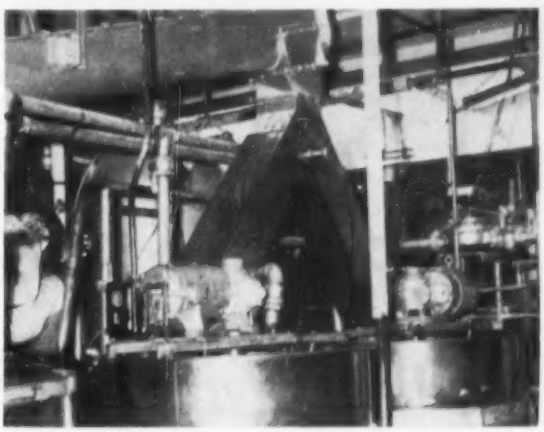
Sugar goes to process via a motorized rotary-vane feeder underneath the bin. The feeder connects to an 800-lb.-capacity weigh hopper, which is directly below roof level. Here, an automatic beam scale (1,000-lb. capacity) links down to a floor scale.

The hopper discharges into an overhead spiral conveyor that feeds three steam-jacketed premix kettles via tap-off chutes. This arrangement offers flexibility for further increase in production, since additional kettles can be fed by other tap-offs from the conveyor.

Flow of sugar from storage to kettles is controlled by an adjustable photoelectric cell mounted on the scale. This unit permits automatic weighing of the exact amount of sugar required for a batch. Operator has pushbutton control of the operation, since the feeder is interlocked with scale controls.

With this specific system (J. C. Corrigan Co., Boston), one man can handle 800 lb. of sugar in about 3 min. And, very important, no sugar is exposed or manually handled in transit.

Typical batch ingredients—fruit or juice, sugar, pectin, and acid—are premixed in the jacketed 150-gal. kettles.

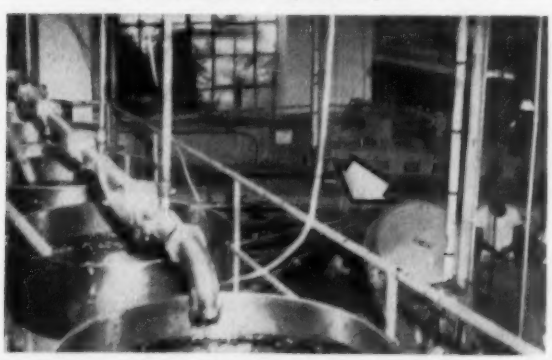


TAP-OFF CHUTES from spiral conveyor drop scaled batches into 150-gal. stainless steel premix kettles.

Corn syrup, when used, is automatically metered from a 40,000-lb. tank. Liquid sugar is available from a 27,000-lb. tank. All kettles and tanks are of stainless steel.

For cooking, batches are drawn into three 150-gal. evaporators. Here the feed, at about 58 Brix, is concentrated to 65-68 Brix. Cooking time ranges from 5 to 40 min., depending on the product.

. . . In Precise Quality Control



BATTERY of 100-gal. stainless steel holding kettles feeds 10-spout filler (arrow) by gravity. Filled tumblers are then capped, cooled, labeled, and cased.

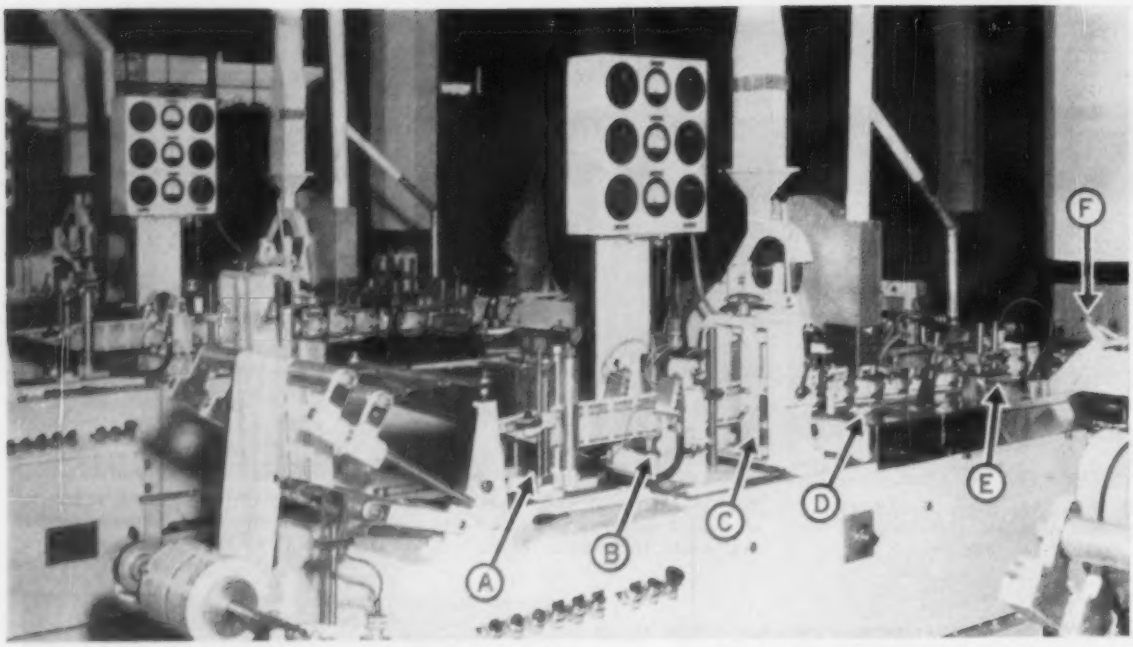
Process Control

Evaporators have conventional instruments for indicating fill, temperature, and vacuum. Batches are cooked at 140 F., and degree of concentration is precisely controlled by in-stream refractometers installed through the jacketed walls of the vacuum pans.

This arrangement eliminates drawing of multiple samples for lab checks. Instead, the pan operator monitors the boil to the proper endpoint by occasional instantaneous readings, which leave him time for other duties. Thus, throughput has been upped to 10,000-15,000 lb. of products per hour.

After cooking, batches are transferred by air pressure to six 100-gal. kettles, in which they are automatically brought to pasteurizing temperature. Steam is regulated

(Turn to page 168)



HERE'S KNOX'S new top-speed gelatin packager. Roll-stock film is folded (A). Package sides and bottom are then heat-sealed (B), and the units are separated by a shearing knife (C). At filling head (D), vacuum cup opens bag to ready it for gelatin charge. Heat sealer (E) then closes package, which is transferred to cartoning section by vacuum arm (F). Note suction headers that remove dust at filling head and sealer.

Dry-Product Packager

Speedier, Less Waste

Automatic-action envelope machine eliminates hand labor . . . Use of bulk paper gains further cost savings

ROBERT J. KELSEY
Assistant Editor, "Food Engineering"

Just substitute roll film for cut stock, then add a dozen mechanical hands—and you have a high-speed, automatic packaging operation that wins cost savings plus.

No question of feasibility either. For Knox Gelatin Co. of Johnstown, N. Y., has demonstrated the full technique, with the help of Bartelt Engineering Co., Rockford, Ill., who supplied the new-style package-forming and filling machine that eliminates gelatin-line bottlenecks.

In short, this unit forms the film into ¼-oz. envelopes, cuts these apart, accurately fills them, stacks them in groups of four, adds a recipe booklet, and then tucks them all into a 1-oz. cardboard carton. And it accomplishes this multi-stage operation at the rate of 90 envelopes per min—with no waste or dust!

With eight of the new units now in operation, Knox has been able to transfer seven workers to places where they are needed more. Company officials say, however, that even bigger savings are in prospect now that the new roll film has replaced the old-style cut stock.

What Makes It Go

The Bartelt machine is driven by a ¾-hp. U.S. Varidrive motor. This operates all chains, plungers, and vacuum arms through a cam-shaft system. Two Perfection pumps supply suction for the various vacuum cups.

Equipment controls are electronic (Barnes Development Co.) and they comprise a photoelectric eye and heater regulators. The photo-eye actuates side and bottom sealers and the shearing knife that cuts individual packages from the roll stock.

Temperature of the heat-sealers is individually controlled by dials located on the upper switch panel (see photo). These knobs set both the running and holding (stopped) heat. Once they are adjusted, the automatic operation continues.

The bottom control console holds indicator lights that show action of the heaters. Also located here are on-off switches for heaters, photo-eye, and vacuum motor. Main stop button is on the right side of the panel—nearest to the operator—and connects to a brake that halts the packager instantly.

Company-Made Filler

Very high filling accuracy is obtained at Knox through utilizing their own filling head. In fact, this unique device holds package weights within 3-4 gr. of the desired ¼-oz. fill.

The unit consists of two adjustable cups, located at either end of a rotating arm. These dip into a feed magazine which is kept at a constant

(*Turn to page 159*)

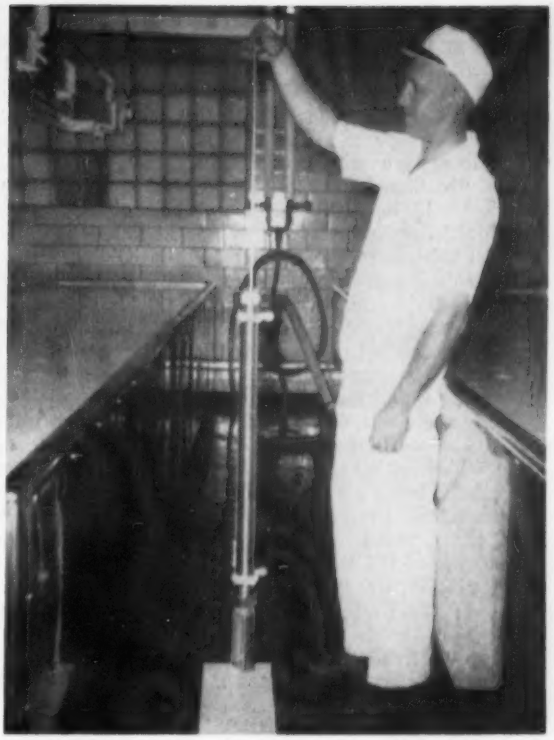
New Curd Meter

Takes Guesswork Out of Cheese Making

By measuring compressability of cottage cheese curd during cooking, it insures a more uniform finished product than can be attained by cheese makers "feel"

ERIK LUNDSTEDT

Consultant and Technical Adviser, H. P. Hood & Sons, Boston



Production of cottage cheese with uniform texture vat-after-vat is now assured by a recently designed instrument, named the Hood Curd Meter.

This device reduces to a mechanical measurement that "something" which the skillful cheese maker determines when he compresses the curd in his hand. And it has now proved itself out in the manufacture of several million pounds of curd.

Cottage cheese making is in reality the art of judging by the feel of a handful of curd whether or not the correct firmness has been attained in the process of heating or "cooking."

Therefore, it is an exception rather than a rule to obtain two vats of cottage cheese that are exactly alike. And to get precise uniformity in a 20-vat operation is almost impossible.

Previously, no test or device had been developed that could duplicate or replace the expert's skill.

The physical character of cottage cheese goes through a series of changes, starting with a very fragile, soft and tender curd to a semi-elastic but breakable one. The hand-squeezing at the finishing state of cooking is mostly a measure of the compressability, but it may also reveal crushability and penetration.

It was with this in mind, that an instrument* was designed to evaluate these characteristics. And the device has now been used in a range of operations, from small experimental vats to large scale production.

Actually, the instrument is rather simple. It incorporates a guided plunger of a specific weight and diameter that falls a measured distance into a definite amount of curd contained in a perforated cylinder or basket. Latter will hold 400g. (slightly over 14 oz.) of curd.

From Art to Science

When the plunger strikes the compacted cheese, a compression, crushing, and penetration takes effect, depending on the firmness of the curd. The compressability and/or crushability is read on a scale graduated in ¼ in. divisions and numbered from 0 to 26.

Tendency for the curd to move up and around the plunger is prevented by the ⅛-in.-dia. perforations of the basket and a fine 20-to-the-inch threading inside the ferrule supporting the basket.

Plunger will penetrate a soft mushy curd to the bottom of the basket—to the extent of 6¼ in. or 26 deg. on the calibrated stem. But as the curd increases in firmness the plunger will stop sooner. Each degree of reading, therefore, represents ¼ in. less compression, crushing, and penetration.

Between 26 and 20 deg., the curd is fragile; between 19 and 13 it is soft and will shatter if dropped on the floor for a test; but between 12 and 8 the cooking is finished, depending on desired firmness in the finished product.

The period of whey drainage, plus shrinkage in wash water, usually firms the cheese another 4 deg. This means that a normal curd, cooked to a 10 deg. reading, will finish out at 6 before creaming.** Below 4 deg., the cheese is rubbery and usually unsaleable.

Experimental Procedure

To test the accuracy of the meter it was decided to heat the curd in a small (50 gal.) vat to various temperatures and hold it at each. This would result in values where the only variables were time of holding and meter readings.

In Fig. 1 are graphic meter readings of cottage cheese made from milk pasteurized at 168 F. for 20 sec. and set overnight with 1% starter but no rennet. Acidity at cutting was 0.70% before CO_2 removal, and 0.60% after, with a pH of 4.4.

Left, or ordinate, side of the chart denotes times, and bottom line, or abcissa, denotes temperatures at which cheese was held. Circled numbers represent meter readings at time and temperature indicated by coordinated lines.

The cheese was heated in 1 hr. to 122 F. and a sample

* Patent Pending

**Firmness of finished cheese varies with different markets. In New England, a meter reading of 6 is representative.

taken immediately for a meter reading. It will be observed that the reading was 26 deg. After 5 min. this same curd gave a reading of 23, and after 10 min., 21 deg. Readings taken at 15, 20, and 25 min. were constant at 17 deg., indicating that this temperature gave a soft mushy type of curd that would not firm up sufficiently to make a suitable texture of cheese.

Curd was then heated to 130 deg. and samples, taken at 0, 5, 10, 15, and 20 min., gave readings of 17, 16, 14, 13, and 13 deg., respectively. These indicated that the curd was still too soft, even after 20 min. holding.

It was then heated to 136 deg. And samples taken at 0, 5, 10, and 15 min. gave readings of 13, 11, 11, and 11 deg., respectively. A further increase to 140 deg. gave readings, after similar time intervals, of 11, 10, 10, and 10 deg. It was apparent that even after extended holding the reading would not go below 10.

Temperature was then raised to 150 deg., where readings at 5 min. intervals progressively dropped (10, 9, 8, 7, 6). The critical temperature of cooking had been reached. Whey was drawn after 20 min. when the reading was 6, and the finished cheese gave a reading of 5.

To the experienced cottage cheese maker, a cooking temperature of 150 F. may seem to be high. However, it must be recalled that this experiment was conducted in a small (50 gal.) vat.

These curd readings are representative of many experimental vats, results of which bring out a significant fact that may or may not be known to professional cheese makers. They prove that:

Each vat of cheese has a critical temperature of cooking, by which is meant the temperature at which the curd will firm properly within a period of 30 min.

This temperature varies from plant to plant and is correlated to the type of milk, temperature of pasteurization, size of vat, size of curd particles, amount of milk in the vat, pH of the curd, amount of casein, rennet, and type of starters. The critical temperature may vary from 90 to 180 F.

The meter was then transferred to the country cheese plant to see if above results would hold true in practice.

Confirmed in Plant

First phase of this work was to compare the individual cheese makers' judgments with meter readings.

Asterisks in Fig. 2 indicate readings when the experienced cheese maker determined the whey should be drawn. And circles indicate readings of the finished cheese.

Two curds cooked at 118 F. (asterisks, lower left hand corner) gave readings of 10 and 9. By the time the cheese was finished, readings were 6 and 5, respectively. Another curd, cooked at about 119 F. and with a reading of 10 at the time of drawing the whey, gave a finished reading of about 5½.

On the right side of the figure will be observed a case of too much haste, whereby the curd was cooked to 130 deg. and the cheese maker directed that the whey be drawn too late. Reading on this vat was 6½ at the time of drawing. The finished curd showed a reading of 4 and was distinctly rubbery.

These results indicate that the sense of "feel," even in the hands of an experienced cheese maker, inevitably results in finished cheeses that are not uniform with respect to texture. Although most of the batches were acceptable, some were slightly soft, several were too firm, and one was noticeably rubbery.

It was then decided to rely entirely on the meter for cooking cheeses and determining proper time to draw the whey. The theory of cooking was explained to the cheese makers—slow uniform cook from 90 to 116 F. in 1 hr. 15 min. with a 30 deg. differential between jacket water

(Turn to page 190)

Graphic Gages of the Fine Points on Cottage Cheese

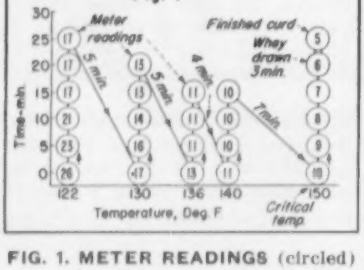


FIG. 1. METER READINGS (circled) prove that time of holding curd below critical temperature does not influence firmness.

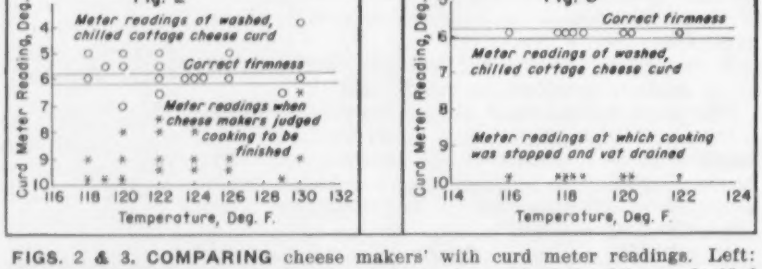
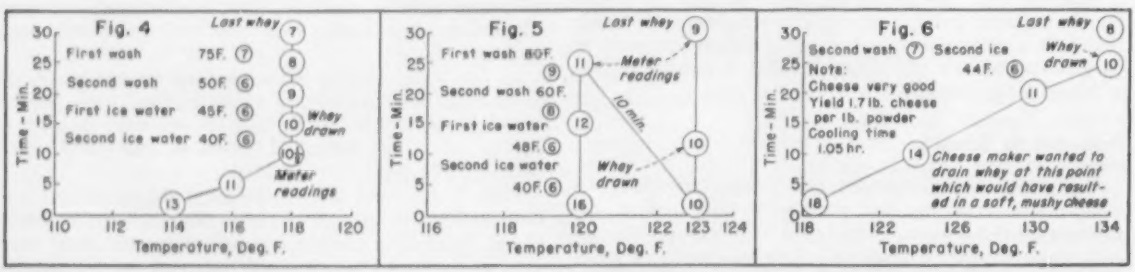
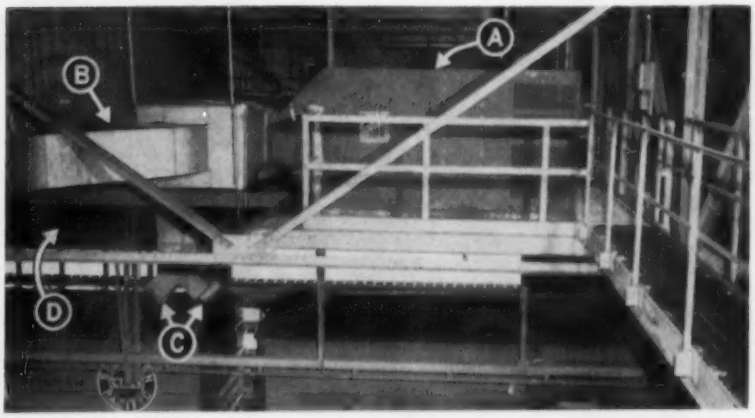


Fig. 2
Meter readings of washed, chilled cottage cheese curd
Correct firmness
Meter readings when * cheese makers judged cooking to be finished
Curd Meter Reading, Deg.
Temperature, Deg. F.
Fig. 3
Correct firmness
Meter readings of washed, chilled cottage cheese curd
Meter readings at which cooking was stopped and vat drained
Curd Meter Reading, Deg.
Temperature, Deg. F.

FIGS. 2 & 3. COMPARING cheese makers' with curd meter readings. Left: Note variations in finished cheese (circles) when end of "cook" was decided by cheese makers "feel." Right: Uniform firmness was achieved when critical temperature was determined by meter readings.



FIGS. 4, 5 & 6. STEPS that insure uniform products with different ingredients. Left: Using fresh skim. Curd cut, allowed to rest at 90 F. for 30 min., and heated to 114 in 1 hr. 10 min. Center: Using mixture of skim and whole milk to produce cheese of 6.2% butterfat. Curd cut at 0.50% acid, allowed to rest 30 min., and heated 90-120 F. in 2 hr. 10 min. Right: Using low-heat powder. Reconstituted skim has 13.5% solids, curd cut at 0.53% acid.



SELF-CONTAINED heater (A) blows warm air through ducts (B). Special baffles (C) direct flow into and around cars. Corrugated drop-walls (as at D) divide warehouse into sections for spot heating. In operation, air drawn through unit passes over combustion chamber, then can be blown to 150 ft. Stainless steel construction of combustion chamber eliminates need for refractory lining. And to save space, units can be installed horizontally in roof trusses (as seen here). Being completely automatic in action, heaters need no attendant — and only periodic inspection. They are actuated by individual wall thermostats located at working level (usually set at 60 F.).

Ceiling-High Oil Burners

Give "Spot-and-Blanket" Heating

Multi-unit installation pares initial and "stand-by" costs, insures against plant-wide breakdown of system

"HEAT CURTAIN" is provided at portals by curved ducts (above door).

ARE you faced, this season, with the need for a new, economical space-heating system—either for a specific storage area or for a processing facility?

If so, the experience of United Fruit Co. at its new Weehawken, N. J., banana terminal may well merit your attention. And particularly so if you require positive on-and-off performance with "capacity when and where you want it."

At UFC's plant, the problem was to protect the fruit from temperatures below 54 F. during its transfer from ships, through grading stations, and on to trucks and rail cars. To complicate this situation, almost 15% of this terminal's wall space is made up of doors that must be frequently opened, thus admitting chilly blasts.

Further, since this warehouse is used only when ships are in, the heating system chosen had to be capable of complete shutdown "on the dot"—and the same speed of turn-on with arrival of new ships.

Initially, the company was even in a quandary as to how to find room for the heating apparatus, because compact arrangement of its materials handling equipment and loading stations put floor area at a premium.

A solution was found, however, by installing 23 high-capacity oil-fired space heaters (Dravo "Counterflo") in the roof trusses. These units, having a total capacity of 29,050,000 Btu. per hr., blanket the entire 145,000 sq. ft. area with 315,000 cfm. of warm air—and give instantaneous heat delivery at open-door points.

Thus, in addition to performing the basic functions, individual heater installations have given UFC four plus-benefits:

1. They eliminate the hazard of a building-wide heating breakdown.

2. Provide "spot" heating, when required, in one or more terminal areas.

3. Save "stand-by" expenses, since units can be directly shut down any time the terminal ceases to operate—yet may readily be turned back on for quick restoration of required temperatures.

4. Are figured to cost 30% less to install than a wet-type central heating system.

Further, the new installation is used at Weehawken to preheat railroad cars prior to loading (previously a task requiring a special night crew equipped with portable heaters).

In the train shed, 72 cars are accommodated on 8 sets of rails for loading simultaneously. Here, 13 of the heating units are mounted overhead—two to a bay. The bays are separated by corrugated metal curtains that drop to about freight-car height.

Running from the heaters are special built-in delivery ducts. These have curved baffles that deliver warm air into and around the cars.

Empty rolling stock is moved into the building about midnight. A watchman advances thermostat settings to 70 deg. And by morning, the cars are warm enough for loading.

The trailer truck bay is served by 7 heaters. Air feeding through these units is ducted from outside through the roof. Fresh air (98,000 cfm.) is thus continually replacing motor-exhaust fumes in the area.

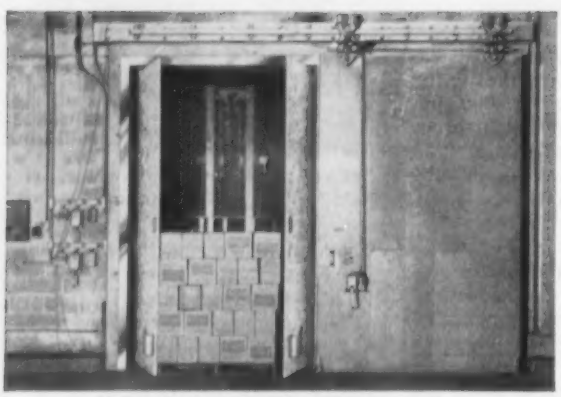
Three other heaters are installed in incoming and outgoing truck-weigh houses and the oil storage house.

Included in the new installation are special safeguards so that the high-mounted heaters will not actuate the terminal's automatic anti-fire sprinkler system. Rate-of-rise temperature compensators have been put in near each unit to act as delay relays in the sprinkler alarm and tripping circuit. Thus normal heat of the oil burners won't "trigger the water."

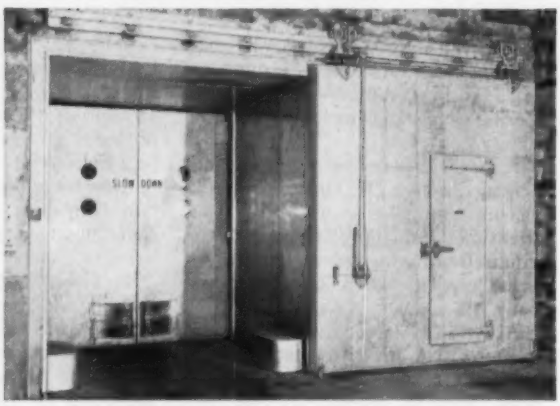
No wasted platform space

Jamison Horizontal Sliding Cold Storage Doors

- conserve floor space
- give tight seal
- permit power operation



Doors for large openings easily supported



Wicket door for personnel passage

Equipped for power operation with remote control

For help on any cold storage door problem, consult your architect or write to JAMISON COLD STORAGE DOOR CO., HAGERSTOWN, MD., U.S.A.

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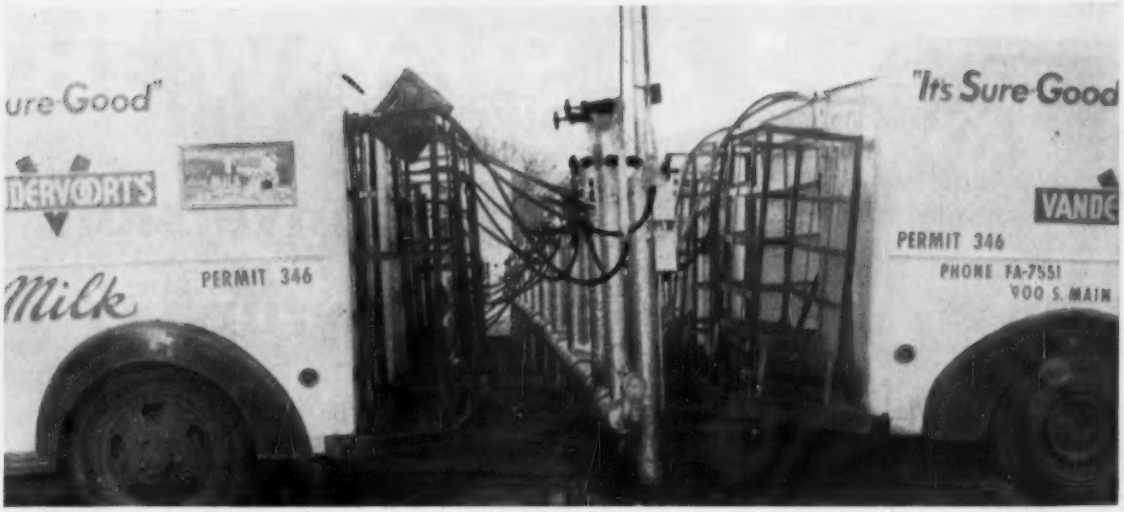
HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.



PRACTICALITY GOT THE NOD when Vandervoort Creamery of Texas set up this yard station for refrigerating its fleet. Seen is just one of the three ammonia service lines rigged on company's 100x150-ft. lot. Trucks are attached in late afternoon, then night crew supervises 28-F. cooling of bodies.

Outdoor Truck-Plate Charging Licks Indoor Squeeze

Further, dairy-truck readying time is cut to a mere 5 hr. by new ammonia compressor and special pipe insulation

ROBERT LATIMER
Special Correspondent, Denver, Colo.

Cooling dairy delivery trucks in the direct rays of a hot Texas sun sounds like the impossible. Yet that's what Vandervoort's Creamery, Inc., of Dallas, does every day of the year.

"When we began operations, with only three trucks, there was plenty of room in the garage to chill the cold-plates," explains Charles Ledbitt, plant engineer. "But our plant is located in an area where building expansion is prohibitively expensive. Thus, as our truck fleet grew, we soon found ourselves forced outside."

Company's initial exterior-charging operation was carried out along a dock at the side of the plant.

Next an open line was installed 50 ft. from the building. It was supplied by a 60-ton liquid ammonia system.

Expands Outside Piping

Gradually, more exterior lines were added, until now the outdoor charging facility includes a 210-ft. underground supply line, 80 ft. of return line to condenser and compressor, and 330 ft. of 3-in. pipe, supported 3 ft. above ground. The latter is run in three lengths, each containing 22 outlets.

In combination with the dock setup, this system now makes it possible to charge 70 trucks simultaneously.

Until last year, however, the original 60-ton ammonia system was handling the entire refrigeration load—accomplishing the job only through sheer long hours of operation.

To eliminate the dangerous factor of daily load demanding total refrigeration capacity, a new 225-ton York ammonia system has been provided. This installation has more than twice the total capacity required to refrigerate truck interiors. Thus it can complete the job in a 5-hr. charging cycle and can also be used to provide refrigeration for units inside the building.

A second step, taken to insure uniform refrigeration for all trucks, was complete insulation of every line and installation of suction traps. Pipes were covered with a 1-in. layer of spun glass, wrapped in weather-proof spiral asbestos, then sprayed with a heavy-duty coating of aluminum paint.

This protection cost $1,200. But it's an investment that will quickly be repaid by lower operating costs and a shorter charging period, according to Mr. Ledbitt.

Overnight Hookup

In the working routine, dairy truck drivers park their vehicles at the end of the day along the three lines. Then a night crew of engineers handles the job of inspecting each unit, snapping together refrigeration couplers (which extend at rear of each truck), and maintaining a watchful check on the charging process.

Refrigerant enters the outdoor circuit at 0 deg. and rises only 3 to 5 deg. while passing through the entire charging line.

Even with trucks exposed to the sun during late afternoon and early morning hours, the system has proved capable of reducing inside-truck temperatures to 28 deg. during the 5-6 hr. cycle.

Refrigeration level in the body then rises slowly during the delivery period, reaching 50 deg. by turn-in time.

For long distance runs, and ice cream and sherbet delivery, Vandervoort's finds it necessary to maintain 14 trucks with self-contained refrigeration systems.

Down to Points On High Conversion Corn Syrup

Candy makers observe its role for faster cooking, tenderer textures, longer shelf-life . . . Performance with 10 specific confections examined . . . Tactics of processing cited

FE STAFF

Details of the favorable characteristics of high conversion corn syrup in modern candy making—along with the specific pros and cons of working practice—got salient consideration at the recent annual production conference of the Pennsylvania Manufacturing Confectioners' Assn. in Lancaster, Pa.

Here, an expert trio went into action: J. A. Kooreman, of Penick & Ford, Ltd., Inc., Cedar Rapids, Iowa; F. Hanly Brock, of A. E. Staley Mfg. Co., Decatur, Ill.; and J. M. Krno of Corn Products Sales Co., New York City.

Their three-phase treatment of the topic centered upon properties, advantages, and limitations of the syrup.

SYRUP PROPERTIES . . .

Enzyme-converted corn syrup is appreciably higher in dextrose and maltose, and correspondingly lower in dextrine and the so-called "higher sugars" than regular or intermediate syrups, according to Mr. Kooreman.

This syrup, he pointed out, is almost twice as sweet as regular corn syrup. Also, its ability to absorb and retain moisture is the most effective of all three types of syrups because of the high ratio of its hygroscopic components, dextrose and maltose.

Viscosity of corn syrups vary with temperature, baumé, and dextrose equivalent. The more dextrines and higher sugars in a syrup, the lower the dextrose equivalent and the greater the resistance of syrup to flow.

← **Representative Confections**

The viscosity varies inversely with temperature. From a practical standpoint, temperature is most important because it may be readily adjusted so as to modify viscosities commensurate with the demands of storage, pumping, distribution, and metering equipment. Enzyme-converted syrup is the least viscous, while the regular type is the most viscous.

Enzyme-converted syrup serves as a crystallization inhibitor much like any other corn syrup. It is hygroscopic, tending toward greater moisture retention and prolonged shelf-life. It is relatively fluid, a factor which affects the texture and body of candies. Because of its low viscosity, it offers less resistance to agitation and whipping.

Compared with other types, it is *per se* sweeter. However, this quality is masked in the presence of sucrose, and other adjuncts, to the point where use of this syrup solely to increase the overall sweetness of confections is not recommended.

ADVANTAGES . . .

The following advantages were noted by Mr. Brock, relative to using high-conversion, rather than other types of corn syrups, in candy-gums.

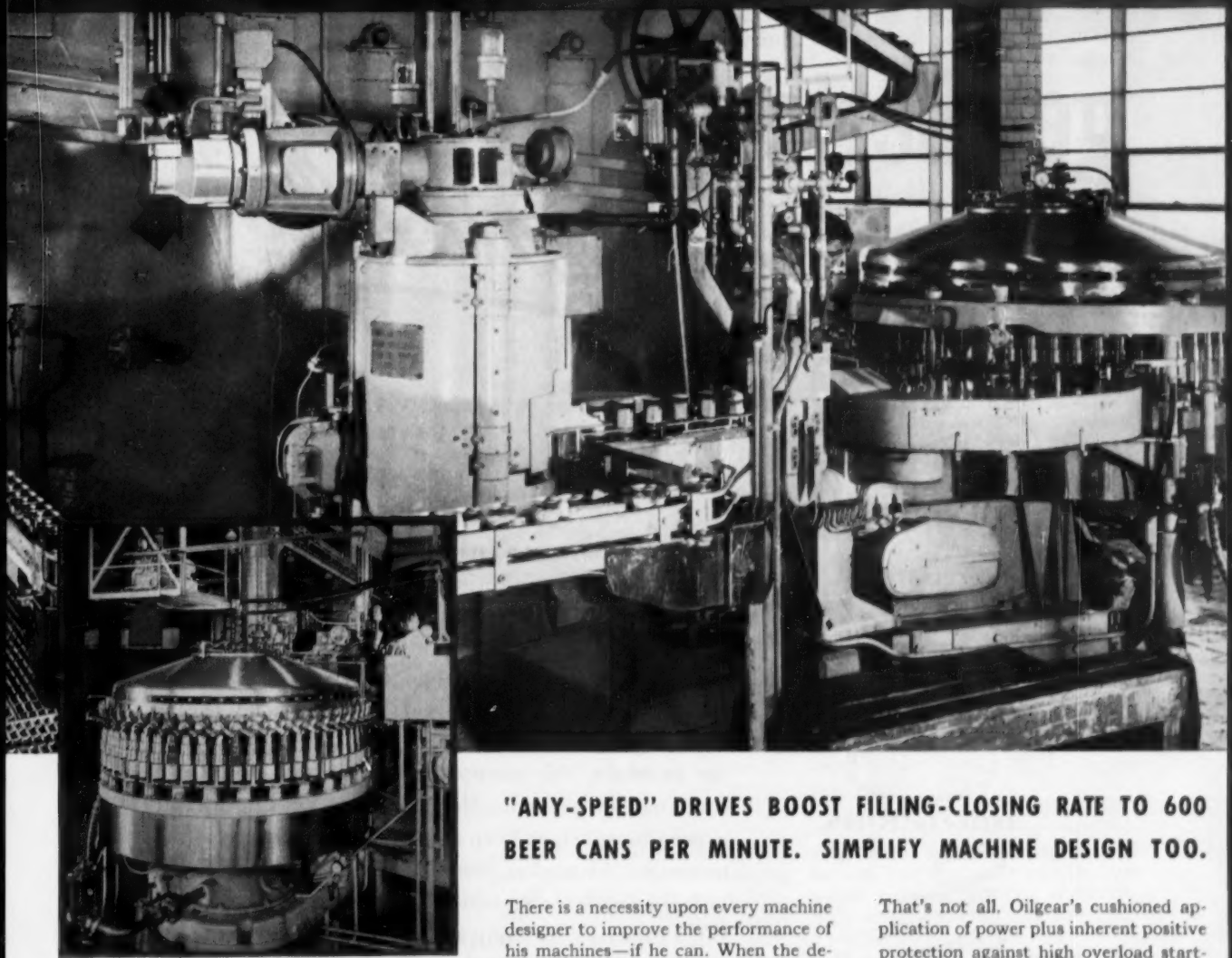
1. Faster cooking and depositing, with less stringing, because batches are not as viscous.

2. More tender-textured jelly candies, particularly after aging.

3. Longer shelf-life, because the candies retain moisture better, and because even where considerable moisture is later lost, viscosity of this syrup is low enough so that it does not impart excessive toughness.

But there are some limitations to the use of high-conversion corn syrup

You too can discover
THE WAY UP IS OILGEAR



Beer Can Filling and Closing Machines equipped with Oilgear "ANY-SPEED" Drives are operating in many breweries. With Oilgear, beer can filling and closing production climbed from 360 to 600 cans a minute.

OILGEAR
Fluid Power

PIONEERS... NOW THREE PLANTS FOR FLUID POWER

PUMPS, MOTORS, TRANSMISSIONS, CYLINDERS & VALVES

"ANY-SPEED" DRIVES BOOST FILLING-CLOSING RATE TO 600 BEER CANS PER MINUTE. SIMPLIFY MACHINE DESIGN TOO.

There is a necessity upon every machine designer to improve the performance of his machines—if he can. When the designers of beer-can filling and closing machines raised the rate from 150 to 360 cans per minute, the drive limit seemed to be reached. Yet, their users wanted more production *without spillage* or can conveyor problems.

Then these engineers tried Oilgear "ANY-SPEED" Drives . . . the Fluid Power and Control that gave them what they wanted and—even more.

These engineers stipulated: • accelerate machines to half speed in 2 seconds • accelerate machines to full speed in 5 seconds • decelerate and stop machines in 4/10 seconds • a filling-closing rate of 425 cans per minute.

The Oilgear drive accelerated and decelerated so smoothly, it actually provided: • acceleration to full speed in 2 seconds • deceleration and stop in 2/10 seconds • a filling-closing rate of 600 cans per minute.

That's not all. Oilgear's cushioned application of power plus inherent positive protection against high overload starting torques and lower overload running torques eliminated the need of mechanical slip clutches. Thus, the machine design is simplified and maintenance is negligible.

This smooth yet swift acceleration and deceleration that allows brewers to handle full cans without spilling is one of two tremendously important Oilgear advantages. Utterly variable, flexible and controllable speed is the other. These and other superiorities are writing new history in machine design. *You ought to know the details of that history.* Why don't you contact a nearby Oilgear engineer, or write to Milwaukee. No cost, but the profits may be great.

THE OILGEAR COMPANY
1580 W. Pierce Street
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Do food packages get better "automatically"?

PROCESS-FITTED

SHELF-PROTECTION

SAFE, SURE-FIRE OPENING

MASTERFUL LITHOGRAPHY

As people's tastes and needs change, any package can slip out of date. It's a full-time job to keep packaging in step with the times. Here at Continental, however, our scientists and engineers are constantly working to make food packages more protective, easier to use and easier to sell.

For example, the one-pound can has been a standard container for ground coffee for years. Yet Continental experts have helped keep this package as modern as the newest on the market. Some improvements include cans tailored either for pressure or vacuum pack . . . longer skirts for easier reclosing and greater shelf protection . . . and most recently, Continental's new "Gripstrip," the *self-tracking* rip strip that never slips off the opener-key.

Perhaps you're not in the coffee business. But whatever your product, Continental can supply a masterfully lithographed and precision-made can to fit it. May we help you to a better package?

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in candy-gum work. Candies lose moisture more slowly to the molding starch than those made with other syrups. Some, like jelly bean centers containing high proportions of this syrup, may require more efficient or longer mold-drying conditions before further processing.

The syrup-to-sugar ratio that can be used without danger of candy sweating is somewhat lower than for other types of corn syrup. A ratio of 60 lb. of high-conversion syrup to 40 of sugar is most satisfactory.

Mr. Brock went on to show the pros and cons in the use of high-conversion corn syrup in specific candies:

Pectin Jellies: Although high-conversion syrup is being employed successfully in pectin-jelly candies, it is generally recommended that the less-hygroscopic regular conversion syrup be used. Pectin jellies usually contain a high proportion of invert sugar formed by the acid employed to set the pectin. The combination of high-conversion syrup and invert may make these candies sweat.

Marshmallows: The high-conversion syrup gives marshmallows a much better moisture retention and longer shelf-life. Initial tenderness of marshmallows made with the various syrups is the same. But on aging, particularly when exposed to air, mallows made of high-conversion syrup stay fresh longer.

Too high a ratio of high-conversion syrup to sugar may cause sweating. Marshmallows made with high-conversion dry more slowly in starch molds. They may be sticky on the surface and tend to adhere together after packing (unless drying conditions are adjusted to bring the candies to the proper moisture level before packing).

Nougat: High-conversion improves tenderness, moisture retention, and shelf-life of short or grained nougat. But regular corn syrup is recommended for chewy nougat, where high viscosity is needed for this particular texture.

Caramels: Because of the low viscosity of high-conversion syrup, caramels cook faster, deposit with less stringing, and turn out 'shorter' and more tender in texture. This syrup gives best results in soft- and coated-caramels. Regular syrup is best where a firmer and more chewy texture is required.

Fudge: Comparative tests have shown that typical fresh fudge squares made with high-conversion syrup lose approximately 20% less water during a 96-hr. exposure to a 66% humidity than those similarly made with regular corn syrup. High-conversion retains moisture and prolongs shelf-life in fudge as in other soft candies.

Frappe: High-conversion is the only sweetener required for light, stable, good-flavored frappe. Viscosity and moisture content of this syrup are suitable for good whipping properties and stability without necessity of boiling off water. And sweetness of the syrup is just right for good flavor.

Excellent frappe is made by whipping albumen solution with part of this syrup at room temperature, heating remaining syrup just to boiling, adding it to the whipped batch, and beating until batch is light.

Fondant and creams: This corn syrup is recommended for fondant, frappe, and bob portions of candy creams. It should not be used to replace sugar in creams. But it does produce a 'shorter,' more tender texture in creams than is obtained with the same proportion of other types of corn syrup.

Taffies and kisses: Ordinarily, high-conversion syrup is not recommended for these candies. Regular conversion syrup is usually preferred, for it imparts a more chewy texture, more body, and drier surfaces with less tendency of the candy to stick to the wrappers.

Coconut candies: This syrup imparts a more tender texture and better moisture retention to coconut candies than other corn syrups. It also gives added sweetness and better flavor. If a pronounced chewy character or special resistance to softening in warm, humid weather are desired in these candies, regular syrup is best.

Hard candies, brittles, and crunches: These candies should be kept low in moisture content. And consequently, high-conversion syrup is not recommended.

High-conversion corn syrup is most applicable in soft candies, where prevention of moisture loss and keeping of a soft, tender texture are desired. The lower viscosity of this syrup makes it easier to pump, pour, and handle. Candies cook faster, whip lighter, and deposit more easily. They have 'shorter,' more tender textures than those made with other corn syrups.

Higher sweetness of this syrup contributes better flavor, especially in candies containing high proportions of syrup, as in frappe, where high-conversion syrup may be the only sweetener. The hygroscopic properties of this syrup make it more effective than other corn syrups for retarding loss of moisture from the finished candies and for extending shelf-life.

LIMITATIONS . . .

First problem that confronts a confectioner considering the choice of the 42-D.E. (dextrose equivalent) regular, 50 to 54-D.E. intermediate, and 60-or-over D.E. high-conversion corn syrups is their handling, reported Mr. Krno.

He declared that if the confectioner specializes in a few related lines, there's no problem, and so the selection is rather easy. But the difficulty arises when the candy maker produces two or more of such candies, like creams, gums, and marshmallows and, at the same time, also makes hard candies, taffies, and kisses.

Ideal set-up, of course, is to use two distributing systems for corn syrup in addition to one for liquid cane sugar.

Majority of confectioners, however, depend upon only one channel for handling corn syrup, with the other type manually removed from a barrel or drum.

True, the confectioner sometimes employs one of these syrups in a seasonal candy that does not conflict with his other items, and then resorts to close scheduling of his production and uses the same distributing channel for the preferred type of corn syrup in making each candy.

Best way to point out the limitations of the high-conversion corn syrups is to consider the production of hard candies. Whether made by an open-fire cook, vacuum cooking, or a combination of both, these candies can either be straight-sugar confections consisting of sucrose and invert or may contain considerable amounts of corn syrup. The latter range in content between 25-40%, and the type of corn syrup used is almost without exception, the regular corn syrup of 42 D.E.

Function of corn syrup in hard candy is to control sucrose crystallization. When used in sufficient amount in clear hard candies, it actually completely prevents formation of crystals, being more effective than invert because of its dextrine content.

High-conversion corn syrups have a much lower dextrine content than the more commonly used regular corn syrup, and are, therefore, less effective as preventers of crystal formation.

Corn syrup also gives hard candy a desirable body or high viscosity—again a function of the dextrine content, with the high-conversion corn syrups being less potent.

Viscosity effect on the solid solution—the confection called hard candy—can easily be demonstrated by making two hard candies by the same formula but using high-conversion corn syrup in one and regular standard corn syrup in the other.

The lollipop, sour ball, candy square, or any similar bulk-packaged hard candy made with high-conversion

(*Turn to page 183*)

HOW TO MAINTAIN *delicate flavors*

Folger Coffee Company has a secret process for instant coffee.

We can't tell you *how* they use PYREX brand glass pipe. But you may profit from knowing *why* – especially if you deal with delicate flavors.

The problem is one of purity. They won't permit impoverishment of the delicate flavor, aroma, or color of their product.

PYREX pipelines help Folger preserve those elusive elements that distinguish its product. Glass pipe is safe beyond doubt–chemically stable, physically strong and durable.

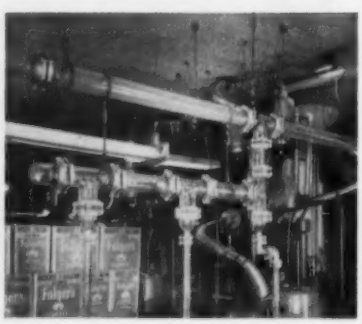
The same stability and strength makes PYREX brand pipe excellent for high-acid foods. The harshest food acid you can name does nothing to glass. You might think cleaning glass pipe in order to maintain this sensitive purity would be difficult. Yet the folks at Folger tell us they clean it *in place* using only hot water.

We're greatly pleased that this company likes PYREX brand glass pipe.

We're certain you'd like it, too.

A copy of our Bulletin EA-1 will tell you more about the many ways PYREX pipe can help you improve your fluid handling operations–and, possibly, your product.

Write, wire or phone for your copy. We'll send it promptly.



You can erect complex layouts with glass pipe. You have a wide variety of fittings, accessories and sizes. It's easy to plumb, too.

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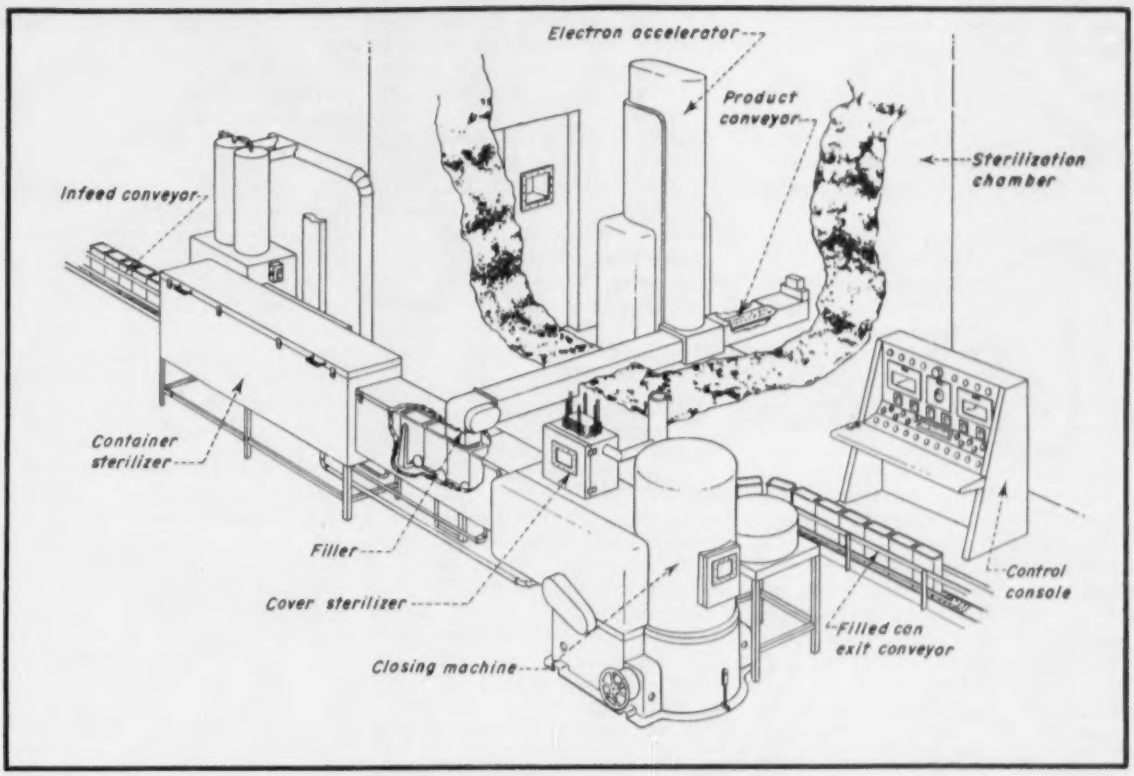
Corning means research in Glass



Food Processing Line of Tomorrow?

POSSIBLE USE of aseptic canning line in conjunction with linear electron accelerator for cold-sterilizing (instead of thermally processing) food products is shown in cutaway schematic. Heat would only be employed to sterilize containers and covers. (Drawing courtesy W. F. & John Barnes Co., Rockford, Ill.)

RADIATION-SOURCE ROUNDUP

QMC's Working Units . . . Check of Gamma and Electron Facilities . . . Power From Reactors . . . Future Picture

BY ALERTLY "DRAWING A BEAD" on every new promising technique to see what it may offer toward providing fresher meals for soldiers at the front, the Quartermaster Corps has been building an outstanding reservoir of facts on advanced processing.

Particularly, the likelihoods of cold sterilization are being ranged through QMC's Food & Container Institute, which has implemented pertinent studies in cooperation with industrial firms and research centers.

A most revealing closeup of this work was obtained at QMFCI's recent Chicago meeting of the Research & Development Associates. Highlight was a panel presided over by R. G. Tischer, director, Food Laboratories, QMFCI, and having as members Capt. R. Pomerantz, radiation sterilization officer, Dr. Bruce H. Morgan, project chief, and Lt. Col. B. S. Evans, Jr., CmlC, nuclear effects engineer—all with QMFCI's Radiation Sterilization Project.

Our special feature, "Food-Radiation Roundup" (FE Aug., p. 43) detailed Capt. Pomerantz' disclosures on the expanding scope of the investigations and also Dr. Morgan's revelations on how different foods stand up under irradiation.

And now in this present article, the nuclear effects engineer spotlights the practical radiation-source "ways and means"—

Evaluation of Irradiation Facilities

B. S. EVANS, JR.

Rapidly being developed are new radiation tools which researchers will employ in the Institute's Radiation Sterilization Project.

First, a word on the various gamma sources: Here, we find that the facility currently most active is the material testing reactor at the National Reactor Site in Idaho. This pile's spent

fuel rods are periodically removed and put into a canal having 18 ft. of water preparatory to the food work.

Hot both thermally and radioactively, these rods are placed in a rack or grid in such manner that sealed containers of food can be lowered into the canal near the rods and thus exposed to an intense gamma flux.

Principal drawback to this method of irradiation, however, is the difficulty in controlling temperature of the samples during irradiation. Also, should there be rupture of the inert metal casing, or cladding, in which the fissionable material is sealed, then some of the soluble fission products would contaminate the canal water and might be deposited on the food containers.

Last April, a new gamma source was opened up at Dugway Proving Ground, Utah, when the Army was licensed to borrow eight spent fuel rods from the materials testing reactor. These are to be used for five or six months, while the more active fission products are decaying to a level of activity that will permit the rods to be sent to a chemical processing plant for the recovery of whatever fissionable material still remains in them.

During this time of their use by the Army, the rods have been arranged in a cylindrical configuration so that food in No. 2 or No. 10 cans can be passed along the axis of the cylinder to get a maximum radiation dose (about 2 megarep./hr.). Here cans move at a regulated rate to control the total dose. The source can handle about four No. 10 or six No. 2 cans an hour for the sterilizing dose of 2 megarep. To make the dose distribution as even as possible, cans are continually rotated at a slow rate.

It is hoped that the temperature eventually can be controlled to within 2 deg. by passing fluids through coils in the 13-ton lead-and-steel shield that encompasses the irradiation field.

About 2 tons of food per month can be processed.

Cobalt Sources

Currently, there is under construction a smaller facility at Dugway to be activated by five plates of cobalt that have been irradiated in the reactor at Brookhaven. These plates are about 14x2¾x¾ in., and are encased in aluminum. Each plate has an estimated activity of between 600 and 700 curies, and when placed in a pentagonal arrangement to permit the passage of No. 2 cans, they will deliver a dose rate estimated at 500,000 rep./hr.

This source is to be used more as a laboratory tool than as a production facility, the aim being to check the effects of a spectrum of gammas, such as obtained from fuel rods, against those of gammas of definite energy from cobalt.

Production rate of this facility will be only about ¾ lb. of food an hour.

A third fuel-element facility has been established at Argonne National Laboratory. It consists of eight rods vertically positioned in a grid at the bottom of an 18-ft. water tank. Here, No. 2 cans will be sealed in metal containers and lowered into predesignated slots in the grid so that total dosage may be controlled.

Replacing the Rods

To keep the radiation level high, four rods a month will be replaced by fresher elements from the materials testing reactor. In an 8-hr. day this facility should be able to deliver a 2,000,000-rep. dose to about 70 No. 2 cans.

There are a number of other cobalt sources now in partial use by the Project. Largest is on the U. of Michigan campus. It consists of a cylindrical arrangement of 100 cobalt rods of ¼ in. dia. and 10 in. long.

At Stanford Research Institute there is a source of about 420 curies of cobalt in a 10-ft.-deep tank resembling a swimming pool. Small vials, or sealed test tubes, can be given a dose as high as 800,000 rep./hr. by placing them inside the pipe-like formation of cobalt sources.

Larger objects can be dosed up to 250,000 rep./hr. by placing them in a small subterranean room that is separated from the pool by a ¾-in. aluminum window. Dose rate can be varied by changing the distance between the source and the window.

Other small cobalt sources used in dosimeter development studies are located at MIT, Columbia and the Naval Research Laboratory in Washington.

The cobalt source at Brookhaven has been used in sprout inhibition of potatoes (though not as a part of our project). Much of this work parallels that done by Brownell's group at Michigan.

Electron Units

We are now using four different types of electron accelerating machines: (1) Resonant transformer of General Electric, (2) Van de Graaff accelerator of High Voltage Engineering Corp., (3) linear accelerator of Applied Radiation Corp., and (4) capacitron of the Electronized Chemicals Corp.

A linear accelerator is also near completion at High Voltage, and General Electric is likewise experimenting in this field.

Our project is currently utilizing the accelerator developed by the Applied Radation Corp. (Walnut Creek, Calif.). The machine produces 4 kw. of electrons at 6 mev. (million electron volts), which under favorable conditions would indicate a possible output of over 600 lb. of sterilized food per hour in 1½ in. thick layers.

Since there is no evident limit to the energy to which electrons can be accelerated, there is the problem of possible nuclear reactions, which might be induced by an electron of sufficient energy to penetrate the nucleus itself and cause the ejection of one or more nucleons.

This question of electrodisintegration is one which has not been investigated very extensively, as indicated by the small amount of scientific literature relative to it.

To help fill this gap in our knowledge, Dr. Lester Skaggs, of Argonne Cancer Hospital at the U. of Chicago, has undertaken a research project to measure threshold energies and cross-sections for interaction of electrons of greater than 10 mev. with nuclei of isotopes of elements found in foods.

His radiation source is a 50-mev. linear accelerator built by High Voltage Engineering Corp., which is also constructing a commercial machine in the 6 to 10-mev. range. The 50-mev. machine, designed primarily for cancer therapy, has a low power output. But its flexibility in energy ranges makes it an excellent tool for the research project.

Feasibility of utilizing a reactor as a gamma source has been considered. Notable drawback is that only about 1% of the energy of fission is available. Over 80% of the energy released is in the form of kinetic energy of the fission fragments themselves, and this is converted into heat.

Power From Reactors, Methods

This suggests the possibility of running a food processing plant by power from the reactor, which also supplies the necessary active fission products to operate the gamma facility.

Several different methods have been suggested for extracting the gamma energy from a reactor:

1. Utilizing a swimming pool-type reactor. When the fissionable rod materials are immersed in a pool of water, items to be irradiated could be moved to the vicinity of the core of the reactor to be exposed to the gammas of the fission process itself.

However, the gamma flux also

(Turn to page 191)

IMITATION
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greater sales appeal...
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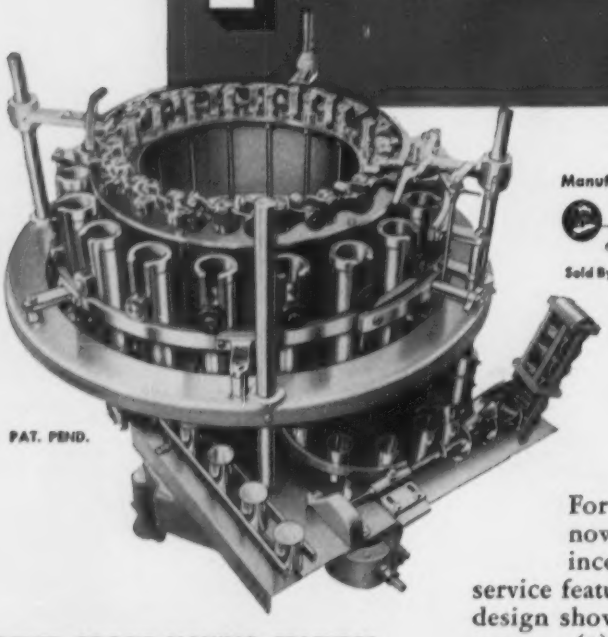
VALVE DESIGN OF NEW *Librascope Filler* 4 WAYS BETTER



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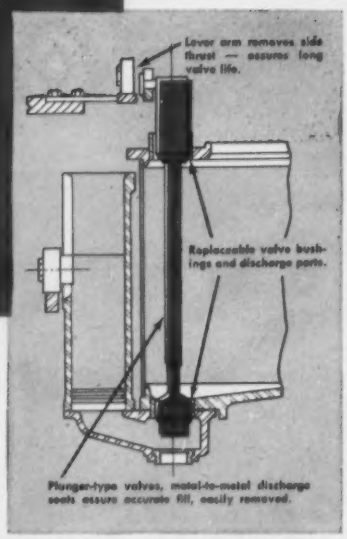
Lever arm removes side thrust — assures long valve life.
Replaceable valve bushings and discharge ports.
Plunger-type valves, metal-to-metal discharge seats assure accurate fill, easily removed.

Cross-section drawing of valve and piston assembly of the Top Fill, Model P Filler. Handles such products as Juice Concentrates, Tomato Paste, Dog Foods, Apple Sauce, and Oils.

For liquids and semi-solids, W. F. & John Barnes now offers the canning industry a new Filler that incorporates many outstanding maintenance and service features. For example, the new plunger-type valve design shown in drawing above, offers 4 distinct advantages — (1) more positive closure against leakage of product; (2) correct amount of fill, including the very first containers through the machine; (3) clean discharge ports after each filling cycle, and (4) longer valve life.

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● **FAST, ACCURATE FILLING** — Up to 800 containers per minute. New valve design, precision machined pistons assure accurate measurement.

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● **FLAT TOP CAM, LARGE DIAMETER PISTON ROLLERS** — Insure accuracy of fill, prevent skidding and wearing flat spots on rollers.

● **UPRIGHT PISTON HEAD DESIGN** — Pistons enter upright cylinders from top, receiving product from bottom. Closed lower end of cylinders guards against leakage.

● **LARGE TURNING RADIUS** — Cylinders arranged on large turning radius permit a more gradual piston rise, reducing side thrust and rate of wear.

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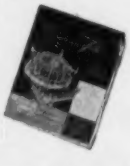
You'll find the new Librascope Filler gives you all of the refinements of accepted and proven practices in addition to the many other new and improved operating features outlined at left. Lower maintenance cost, combined with high output capacity, are features that will save you time and help reduce processing costs.



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Ole Sage Episode

PROMOTE THE HELPER? OR GET A NEW MAN?

Making the horse-sense decision here isn't so simple —in fact, becomes a tough dilemma—when your union contract is tight with its clauses

IVAN C. MILLER
Associate Editor, "Food Engineering"

Personnel Manager Milt Sorenson looked up from his littered desk just as Old Sage sauntered in.

"Boy, am I glad to see you!" he exclaimed. "I was going to call you, but then remembered you'd likely be coming in, since you're due today for your monthly visit."

Ole settled his big frame in one of the more comfortable chairs. "What's the matter, Milt," he asked good-naturedly. "Get yourself out on a limb again with the union?"

"As a matter of fact, we *are* out on a limb," admitted Milt. Then he cockeyed his head at Ole. "But this time it isn't *my* fault its—*yours*. You remember about a half year ago when we called you in to help negotiate our union contract? Well, that seniority clause you stuck us with has come home to roost."

"As I remember," Ole parried, "the contract was all lined up when I came into the picture—wages, dues check-off, division of overtime, and all that. The only remaining dispute concerned the seniority and promotion clause. You people wanted a free hand to promote workers on the basis of their ability with due consideration to seniority, of course. On the other hand, the union wanted to make seniority the only qualification, or at least the chief one.

"Then we finally worked out a compromise formulation. And if you'll just think back, you were mighty pleased about it."

"No matter," came back Sorenson, "that compromise has done it. Let me explain: Old Paddy Gordon, our multi-scale filling machine operator, is retiring next month. And the union wants us to promote the senior helper in that department.

"Now, I don't have to tell you that a really intelligent worker can learn how to keep that filler operating satisfactorily in six months. However, you also know, that there are other men who'd require as much as two years' training to catch on to it. And that's just it: This senior helper is a good worker—steady and all right as a *helper*. But we don't think he can qualify to operate that machine efficiently without an awful lot of training.

"So what we want to do is hire a certain well-recommended applicant we have on the files. He's a really experienced operator who used to run the same kind of machine for another company. Right now, he's working in a plant some distance away. But his wife's family lives on a farm near here, so he's anxious to come to work for us. He could step right in and take over."

"Well," said Ole, "let's see what the contract actually specifies about it."

"But that's the trouble," Milt lamented as he thumbed through the pages of the contract to the seniority section.

The Personnel Manager cocked his head at Ole. "This time," he said, "it isn't my fault—it's yours."

"The compromise you worked in here only postponed the dispute—it didn't solve it. This contract merely says, 'When a vacancy occurs in a skilled job, seniority and ability to perform the work available will be considered.'

"And I ask you," continued Milt, "what does that mean?"

Ole mused, then asked: "Just what would you like to think it meant?"

"Our viewpoint there," replied Milt, "is that the replacement employee has to be able to do that work right now. But of course, the union says the senior man merely has to be sufficiently well qualified so that he *could do the work after a period of training*. All of which makes me think it would have been better if we'd fought it to a show-down when we negotiated—to get a more favorable clause."

"Maybe so," remarked Ole, "but you seem to have forgotten what the situation was at that time. A new administration had taken over the union, and the new officers were threatening a strike over that very issue. I

(*Turn page*)

Meet Ole Sage . . .

Up the hard way came Ole, our principal character in this special series of "cases" fictionized to pinpoint boss-worker problems in the 1955 food plant.

Ole began as a laborer, proved himself "a good worker" who "used his head" —thus won the respect of both workers and bosses. He later rose to foreman, then superintendent. And finally he was management's choice as "a natural" to head Industrial Relations, a job he carried out with unusual success until his retirement.

—Actually, his was a very short retirement. Because his old company, and others, too, quickly were calling on him for counsel—as related in these episodes.—*The Editors*

seem to recall that you didn't want any interruption of production and that you figured if you could just get out of the current difficulty then things might shake down and work out all right."

Ole pondered a moment, then continued, "However, that's water over the dam. So let's see what we can do *now*. Under the circumstances you describe, I think the contract gives management the right to hire a new man for the job.

"But," he went on, "there's another aspect: Have you looked into the possibility of keeping Paddy Gordon on until things slow down a bit, and meanwhile giving the senior helper a chance to learn?"

Sorenson shook his head vigorously. "No—that won't do it. Gordon's determined to leave right after his 65th birthday. He's made arrangements to move to Florida. Besides, I don't want to work like that on a matter of this kind, for it might set a 'precedent' that could give us much more trouble later."

"Well, it seems to me that the only thing left is arbitration," Ole concluded. "But I suggest you take the initiative on this. I mean, quickly notify the arbitration people—in accordance with the contract—that there's a dispute over a contract interpretation. Because if the arbitrators' decision is in before hiring of the new man, it will at least serve as a protection against a back-pay bill—that is, in case the decision goes against you."

Milt Retracts His 'Cracks'

Almost six week passed before Ole again dropped in to see Milt Sorenson. This time he found him in a happy mood.

"I certainly take back those cracks I made about the way you negotiated our seniority clause," Milt grinned. "Putting the word 'available' into the contract saved the day. Here's what the arbitrators said, and he read—

The contract does not specifically stipulate present ability to perform the work available, as contended by the company. Neither does it state ability after a period of training, as pressed by the union. However, the contract does refer to ability to perform the work available.

'Work available' suggests work presently on hand or on order to be performed, as distinguished from work which might be received in the future. It implies a demand for the company's product which must be met with reasonable promptness if the company is to remain in business.

It can hardly be said that work is available if the delay incurred in producing it results in cancellation of the order. It seems reasonable to conclude that work available contemplates work presently to be done. In consequence, ability to perform the work available would indicate a present ability to perform work presently to be done.

An ability acquired only after an extended period of training would be of no use to the company with respect to work which had to be done at once.

Ole thought for a while as Sorenson finished. "You know," he finally said, "we got through by the skin of our teeth. I really wasn't sure we'd win."

"Lucky we did," added Milt. "But more important is the fact that for the rest of the contract term the seniority clause will be interpreted our way if similar situations arise.

"I'll tell you one thing, though, Ole: I'm not going to try to make too much of it. You see, during the height of the season we just couldn't replace Patty Gordon with a man who isn't fully qualified. However, if any opening occurs, and if circumstances permit, I'm going to give that senior helper a break—even if it means some training or extra supervision for a while."

Editor's Note:—The settlement quoted in this fictional episode is taken from an actual parallel case that was weighed under rules of the American Arbitration Assn.

Particularly, readers should not infer that other arbitrators would reach the same decision in apparently similar cases, since circumstances differ widely.

Rather than being based on precedent, decisions derive from case histories, points of contracts, and evidence.

From Ole's Notebook

CLIPPINGS & COMMENTS

Thinking? Or Acting?

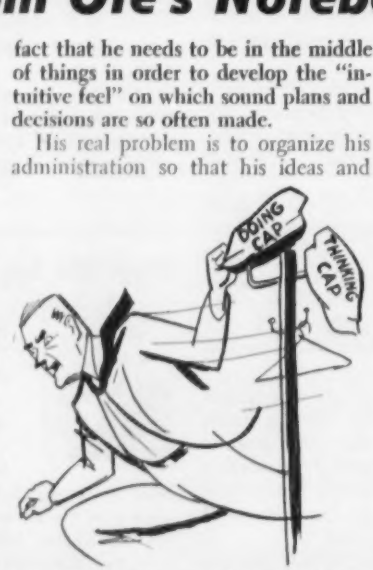
It is well for the top executive to have time to think free from tedious details.

But more often than not, the progress of his company is a by-product of his very busy day's work.

The impetus will come from the sparks his mind receives from his contact with people, inside and outside of business, from his impatience and his dissatisfactions, from flashes of insight coming to him as he struggles with the problems of the business, or when suddenly he sees the business with fresh eyes in relations to its customers, or to the public.

■ **In short, the idea that the chief executive should be completely free to just sit and ponder and plan for the growth of the business overlooks the fact that he needs to be in the middle of things in order to develop the "intuitive feel" on which sound plans and decisions are so often made.**

His real problem is to organize his administration so that his ideas and



impulses for the growth and progress of the business will be translated into action.—*The Management Review.*

Safety Timetable

It takes one minute to write a safety rule, one hour to hold a safety meeting, one week to plan a safety program, one month to put it into operation, one year to win a safety award, and a lifetime to make a safe worker.

And—it takes just one second to destroy it all with an accident.—*The Supervisor's News Digest (Consolidated Mining & Smelting Co. of Canada, Ltd., Trail, B. C.).*

No. 1 in Personnel Plans

Without one prime requisite, any attempt at an effective personnel program will fall by the wayside. That requisite is an enlightened and understanding top management.

In truth, industrial relations functions are never "up to normal," therefore there is a continuing job calling

(*Turn to page 115*)

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Save first, and always, with a Dodge truck! New low prices bring famous Dodge dependability within the reach of every truck owner. What's more, Dodge work-proved long life and low operating costs mean extra savings over the years.

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Walter S. Johnson Building Co., Inc.
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Radiator Shutters Cut Fleet Costs

FUEL SAVINGS up to 10% for its fleet of trucks are reported by Ward Baking Co.'s transportation manager, Oscar E. H. Froelich, with automatic radiator shutters.

Installed on 90% of the baker's fleet (2,766 vehicles) over the past 20 years, the shutter constantly keeps engine temperature at the most efficient levels. They are particularly valuable in very low temperatures. Thermostatically controlled, they make it possible for the truck operator to decide on the optimum temperature for his radiator and keep it within 8 deg. F. of that figure.

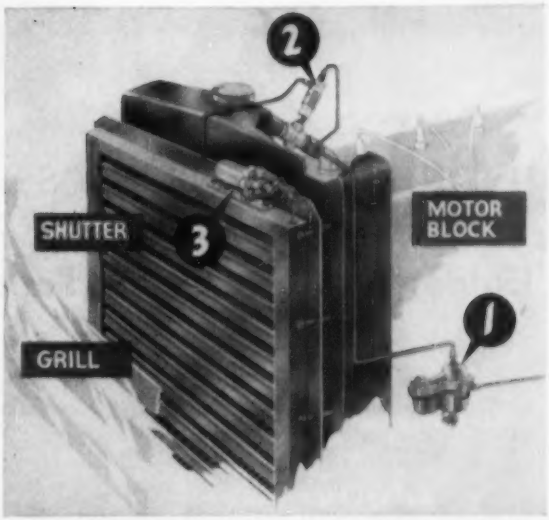
In addition to the fuel saving, maintenance costs also are cut. For the heat regulation reduces cylinder wear, thus minimizing the need for cylinder rebores and sleeve replacements.

Oil consumption is also reduced and engine sludge curbed.

The shutters do not eliminate the need for anti-freeze, but are termed much more effective than the conventional canvas or cloth covers.

Many truck makers supply a thermostat on the water line between the top of the motor block and the top of the radiator. When the temperature of the water passing through the radiator drops below the set point, the thermostat shuts off the flow of water to the radiator. While this subjects radiator water to increased cooling from inrushing air, engine block temperature increases until thermostat opens. Then relatively-cold water is released to heated engine.

However, the automatic shutters allow the water to continue circulating through the radiator system, the vanes of the new unit adjusting temperature by admitting or damming out the air flow.



COMPONENTS of automatic device, showing shutters, power source (1), Shutterstat control (2), and air cylinder (3). In addition to this air operated unit, Kysor equipment is also available in both vacuum and hydraulic form.

In use on the Ward trucks are automatic shutters made both by Hardy Mfg. Co., Pendleton, Ind. (2,450 vehicles), and Kysor Heater Co., Cadillac, Mich. (316 vehicles). It also may be cited here that shutters are employed on trucks operated by Armour and Company from its Chicago plant.

The devices made by Kysor are typical. They comprise shutter, power control, Shutterstat (thermostatic unit), and a control cylinder that opens and closes the vanes.

There are three models, each employing a different power source—hydraulic, vacuum, and air. The first named is run by the oil-pressure line, the vac' by the truck's vacuum-reserve tank, and the air unit by the air-brake reservoir.

Ole's Notebook

—*Continued from page 112*

for the personnel director to share with top management the task of defining objectives and formulating policy.

Although the personnel director may recommend a plan of action, the acceptance, modification, expansion, or discarding of it must be strictly up to his top bosses.

Consequently, the degree to which highest management possesses a progressive and objective viewpoint, an understanding of human values, and common sense, will be reflected directly in the effectiveness or failure of personnel policies.—*J. J. Morrow, Director of Personnel Relations, Pitney-Bowes, Inc., Stamford, Conn.*

More Calls for Experience

Demands for men over 40 to fill executive jobs are on the increase.

It's noted here that the Forty-Plus Club of New York, Inc. (220 Broadway) exclusively comprises such older men who are out of work—and last year found jobs for almost 50% of its members. — *Lawrence Stessin, in "Forbes."*

OBSERVATIONS

Check It With PR and PA

When faulty public relations result in a bad effect on sales, management is quick to go in for some deep thinking.

However, this thinking should be *before*, not *after*.

Thus comes management's aim that each company endeavor shall merit a positive acceptance by customers, community—and suppliers too—and that acts that might engender criticism or ill-will be recognized in advance and sifted out of the picture.

All commitments or changes of policy should, therefore, first clear through a public relations department that is advisory to the president and serves as a top level function of management.

Too often lost sight of is the fact that all questions of management policy, also, have employee-relations implications—just as important to keep favorable as are relations to public, community, and suppliers.

Many costly labor-management difficulties, many morale-shattering misunderstandings might be avoided by getting the personnel administration's viewpoint before plans and policies are finally decided on.

Where personnel administration doesn't appear to merit such responsibility, then it may be wise to revamp that office.

State U.C. Versus Federal

Over 90% of companies surveyed by the Bureau of National Affairs, Inc., Washington, prefer the present state system of unemployment compensation to a national system.

The most common argument they offer is that the individual states are in a better position than the federal government to understand and meet local needs.

In Behalf of Progress . . .

Golden Opportunity in Food Law's 50th Anniversary

Fifty years ago, come June 30, one of the most significant events in the history of the American food manufacturing industry took place. On that date, the first Federal pure food law was enacted.

Thirty-two years later, this Federal Food & Drug Act of 1906 was improved and extended by the Food, Drug & Cosmetic Act of 1938.

Few responsible people in the food industry will deny the importance of this pure food regulation to the past, present, and future success of our great industry—and of the companies and people in it. All will concede that consumers have benefited.

This is not to say that all are pleased with everything about the legislation, or its administration. Nor does it imply that there is no room for improvement. To the contrary, several amendments to the pure food law have been proposed in the past few years. With these has come considerable controversy, even among food manufacturers themselves, as to exactly how the law should be changed. This situation, we are happy to report, shows evidence of simmering down to a workable agreement.

Involved in the controversy have been some misleading information and misplaced emphasis. All of which has promoted a too widely held popular concept that food manufacturers are continually dreaming up ways to "cheapen" their products. Also, that they add undesirable "chemicals" to foods under the guise of progress.

So as things have developed in the past half century, we stand now with a great achievement which merits recognition—plus a couple of problems that need solutions.

And it seems that there is an opportunity to make progress on the problems by turning the spotlight on the achievement.

This spotlight would be lit by celebrating the 50th anniversary of the pure food law. Some ideas and plans to this end already are stirring the industry. We hear that the Institute of Food Technologists may celebrate the anniversary at its 1956 annual meeting. This seems like an excellent thing to do. Other technical men in the field have thought of asking the Postmaster General to produce a special-issue stamp commemorating the anniversary. This, too, appears to have much merit.

Prompted by these worthy examples, we have come up with another suggestion. It is that food companies, especially the national-brand firms, call attention to the 50th anniversary, and to the import of the law, in their advertising. One way of getting this done would be for their association to develop a standard message, or emblem, that could be carried in food advertisements.

You may think that to do this would give the Food & Drug Administration a big play. And you would be right.

But FDA can use help in getting the appropriations which it needs from Congress to continue its effective work. It ought to have more money not only to protect consumers, but to guard food manufacturers against the irresponsible acts of a few.

That, however, is not the major value that could come from putting the pure food law into the limelight.

The big payoff to food manufacturers would be the enlightment of the public to the fact that the food industry's first thought is for the purity and nutritional quality of its products—and the health and well-being of its customers.

And this point could be made: Food companies are more than happy to operate under the pure food law and to produce foods that meet and exceed the legal requirements.

It would be of great benefit to make consumers aware that the quality of foods is closely controlled. For the conclusion would follow that responsible food companies do not put deleterious or dangerous ingredients into their products.

Some in the industry are too close to day-by-day control of quality to think like consumers. They can't see the viewpoint of those whose only connection with food is to pay for it and eat it. The latter generally are not aware of the good job done by food manufacturers. They aren't even adequately aware of the food manufacturing industry.

There is still another value to be received from publicizing the food and drug law. Once the people and their political representatives come to understand that the industry welcomes—and supports—sound pure food laws and regulations, the more attention Congress will pay to the desires of the industry when the current law is being amended. As a result, the new law might be more effective, less expensive to operate under, and more conducive to technical progress in food product formulation and manufacture.

Add it all up, and the golden anniversary of the food and drug law offers our industry a golden opportunity. Here is the chance of half a century to promote goodwill, to boost the industry's stature, and to protect food manufacturers against the future.

If your customers gave your products a "bug count"

These Petrie dishes give a graphic demonstration of the high degree of spore and yeast removal that can be achieved with Celite filtration.

CELITE FILTRATION removes spores and yeast plus all suspended impurities

How can you be sure that your products are at their very best when they go into the laboratory of an important customer or prospect? One good way is to use the most thorough method of clarification available. That's Celite* diatomite filtration which gives you a filter cake hundreds of times finer than the finest wire mesh. It not only removes suspended impurities, but polishes filtrates to a brilliant sparkling clarity.

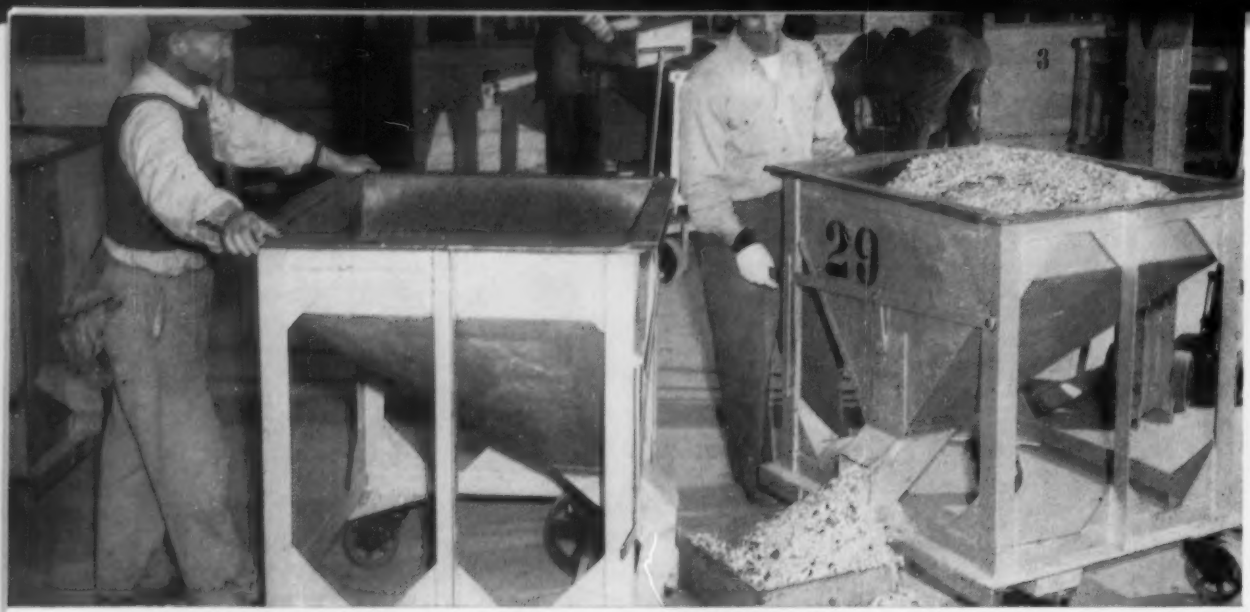
Celite is as economical as it is thorough. Only small amounts are required to keep the filter cake open. Fastest flow rates are obtained from the 2,500,000 filter channels in every square inch. And Celite can be used with almost any filter. Automatic operation eliminates the need for costly skilled labor.

Celite is being used successfully today for filtering sugar, beer, syrups, jellies, cooking oils and fats and many other products which at some stage are in a liquid state. Perhaps it offers advantages for your processes too. Write for full facts today.

For further information on Celite filtration for your products write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, address 565 Lakeshore Rd. E., Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

Johns-Manville CELITE FILTER AIDS



1 **MOBILE TUBS** are employed to distribute vined peas or Ford Hook limas coming from loading dock. They go via chutes to cleaners on floor below.

Freezing Line 'Doubles' for Peas and Limas

This special setup of equipment with batch freezers achieves streamlined, highly mechanized production layout that's able to compete labor-wise with the continuous-contact freezer lines

COMING FROM the viners, both peas and limas are carried into the plant of Seabrook Farms Co., in New Jersey, in palletized 55-gal. removable-head drums, 4 to the pallet, 52 to the trailer load.

After transfer from these drums to portable tubs — Point (1) of accompanying foldout flowsheet—the peas or beans are fed in controlled amounts to gravity cleaners in the basement of the plant, for preliminary cleaning.

Cleaners discharge them into the buckets of a battery of elevators, with the amount to each bucket approximately uniform. And by speeding the travel of the elevators, product volume processed can be increased.

From the basement, the peas or limas are lifted to the plant roof, where buckets are emptied at uniform rate, providing steady flow to the stone cleaners—Point (4)—where heavier-than-water impurities and trash are removed.

Once they are through the size-reels, where off-size product is separated, the legumes continue to the blanchers for enzyme inactivation at controlled temperatures.

The product discharged from the blanchers is picked up by pump and transported in a stream of water to dewatering reels, preparatory to entering the brine quality graders for separation of floaters and sinkers.

Up to this point, all pea and lima processing is the same. Now, however, lima floaters are specially processed,

BEHIND THE EFFICIENCY of Seabrook's lines lies a very revealing story of time-motion improvements (see special article on p. 61)

whereas both pea and lima sinkers from the grader are flumed to pneumatic separators—Point (7)—for removal of skins and splits.

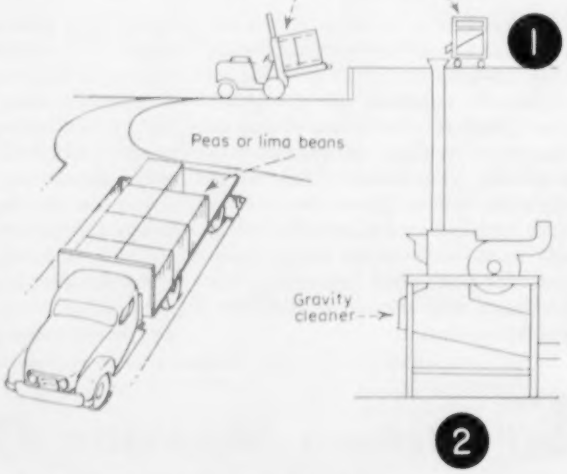
Before products enter the separator, water is removed through dewatering conveyors, piped to vibrating screen cleaners, and returned to the fluming system.

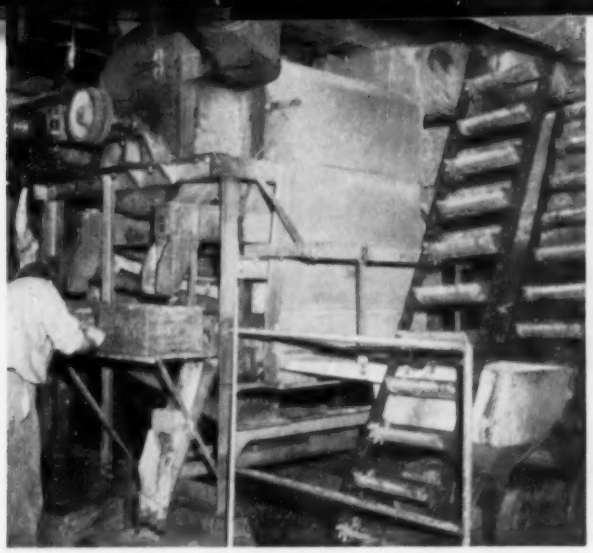
Next, the skin-free products issue from the separators, via vibrator spreaders, onto inspection and sorting conveyors for manual removal of rejects.

Following this check, the peas or limas are transported in mobile tubs to chutes supplying electric-eye-controlled hoppers that feed the filling machine.

After filling and overwrapping, packages are trayed and loaded onto mobile racks, on which they are truck-transported to Amerio double-contact plate freezers. After the freezing cycle, tray racks go to casing assembly.

Going back to the Ford Hook lima floaters, it is noted that after pneumatic separation of skins and manual inspection, these are transported in tubs to batteries of electronic sorters—Point (9)—before packaging and freezing.

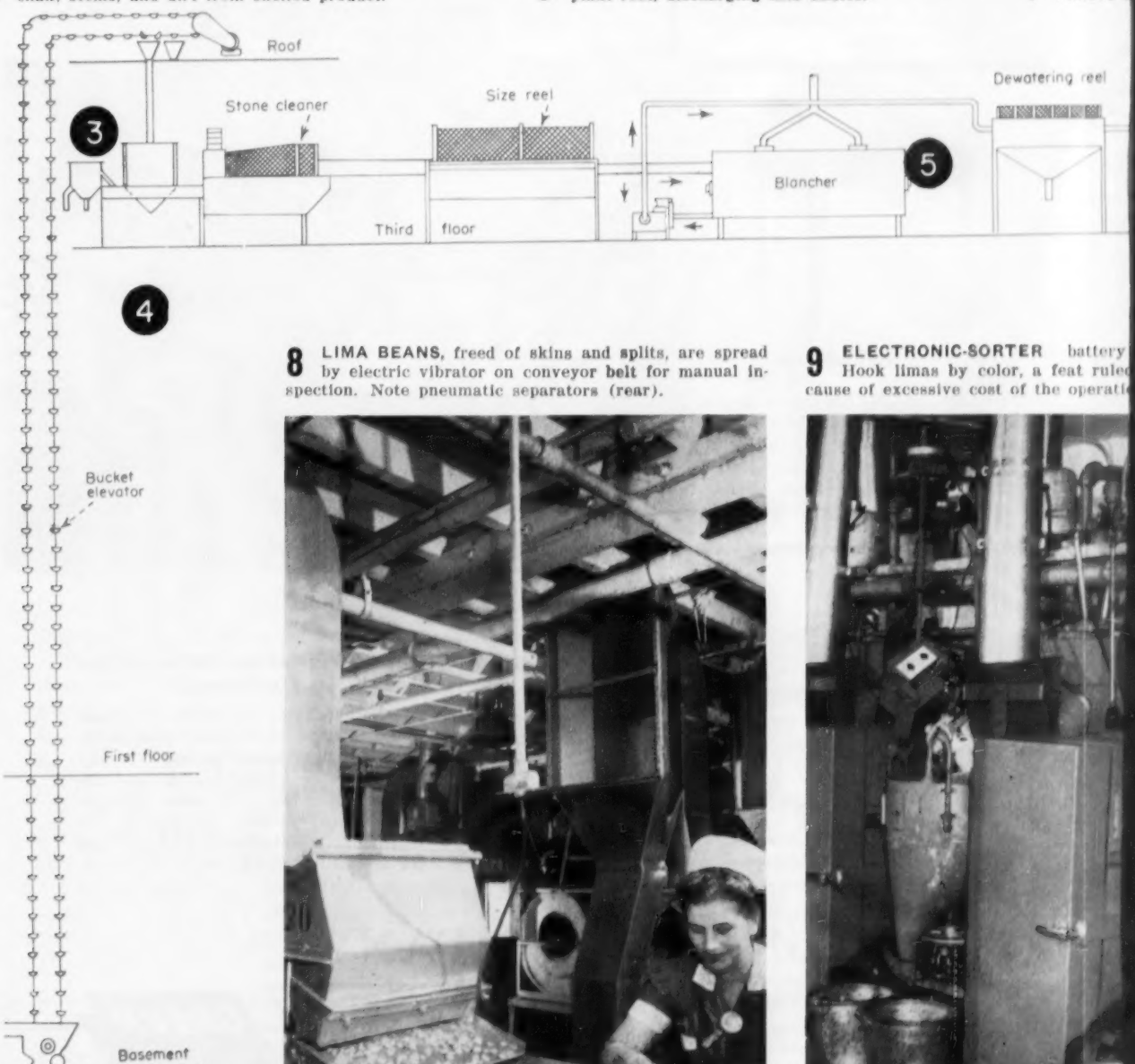




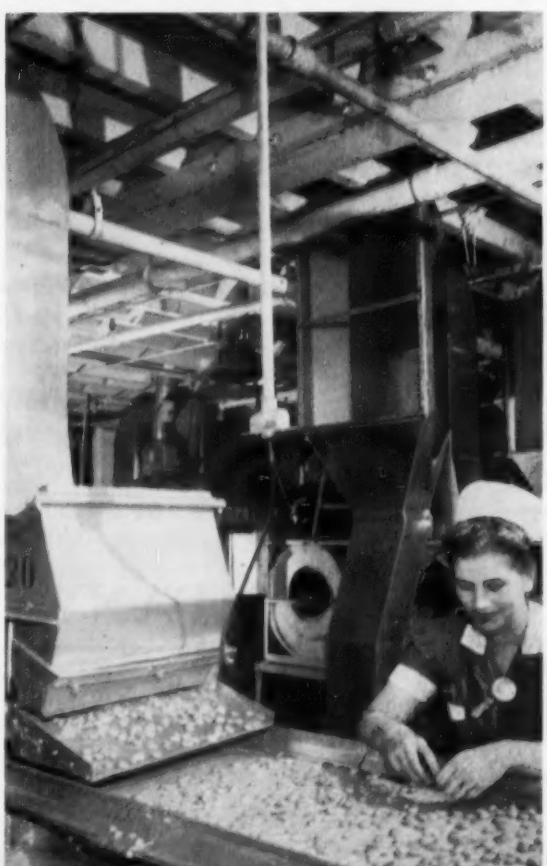
2 **CLEANERS'** air blasts and vibrating screens separate chaff, stems, and dirt from shelled product.

3 **BUCKET ELEVATORS** transport legumes to plant roof, discharging into chutes.

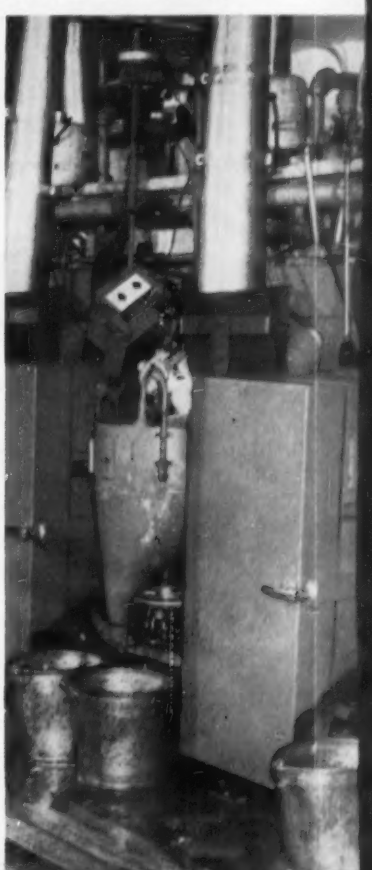
4 **STONER** remove f

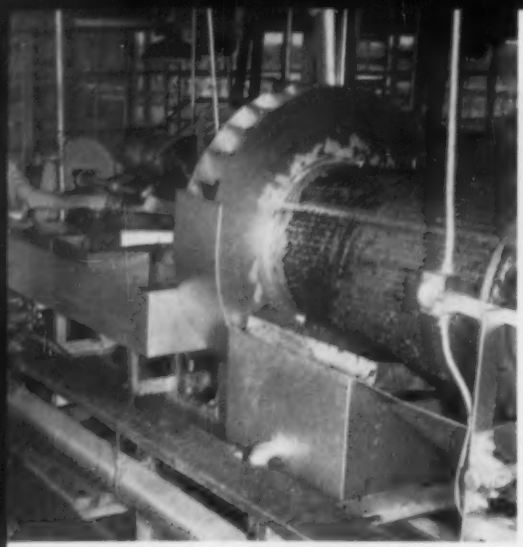


8 **LIMA BEANS,** freed of skins and splits, are spread by electric vibrator on conveyor belt for manual inspection. Note pneumatic separators (rear).

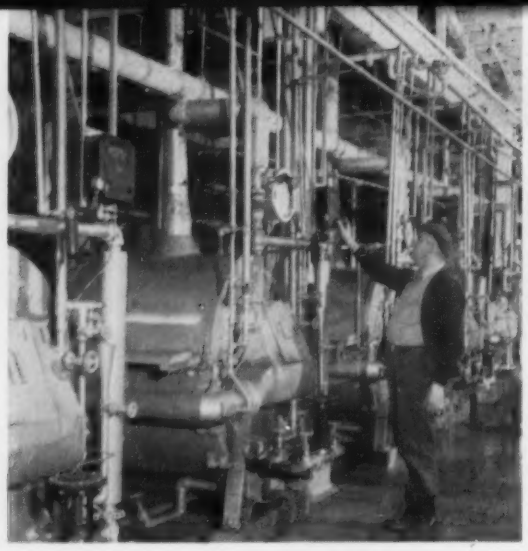


9 **ELECTRONIC-SORTER** battery Hook limas by color, a feat rule cause of excessive cost of the operati



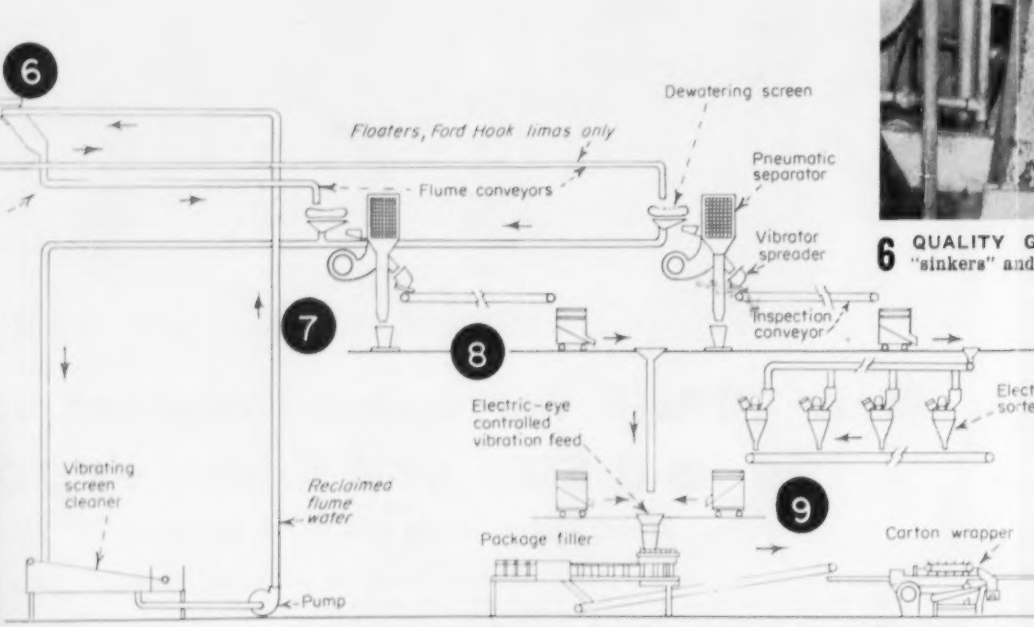


ONERS on top floor of plant wash products as well as ove floating debris and any pebbles.



5 IN BLANCHERS (temperature controlled), product is heated for exact time to inactivate enzymes.

6 QUALITY G
"sinkers" and

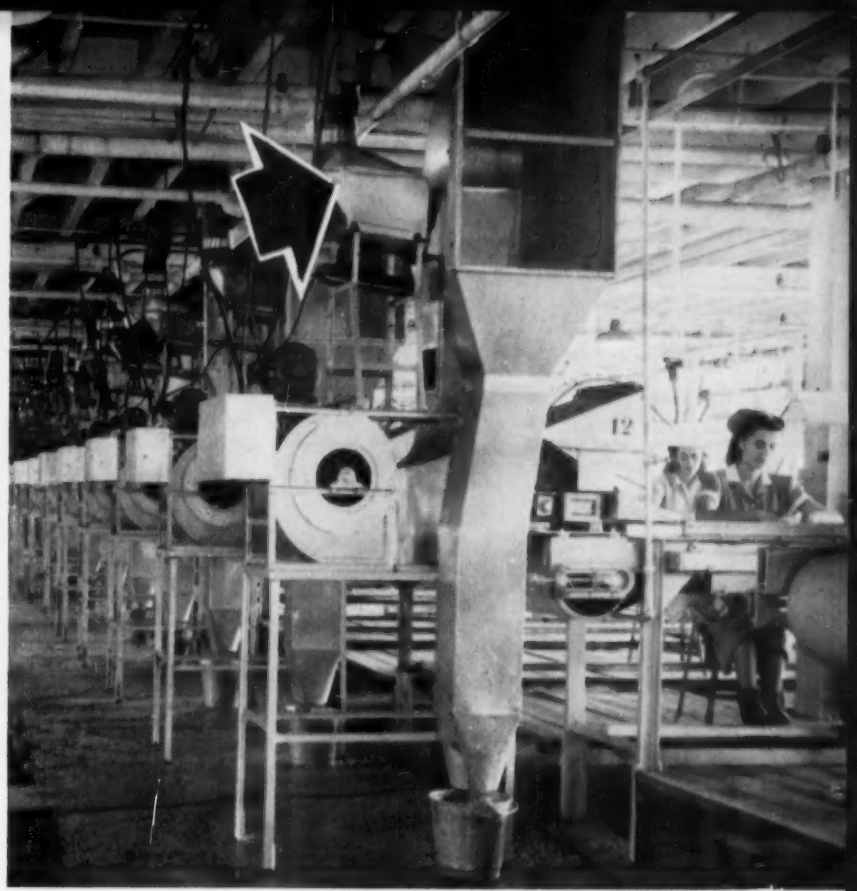


ttery separates Ford ruled out manually beeration.

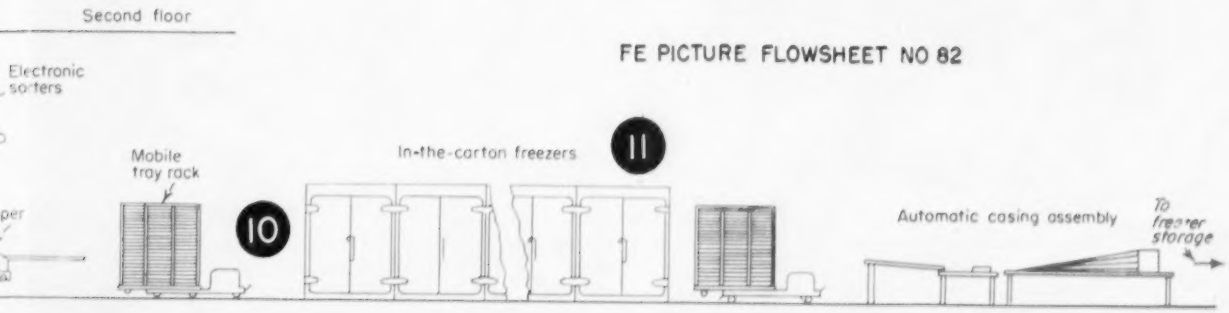
9A SORTER CLOSE-UP, showing limas lifted by suction prongs for E-Ray color selection.

10 LOW-LIFT TRUCK (background in ais freezers. Latter units are seldom emptie

TY GRADER separates products into " and "floaters."

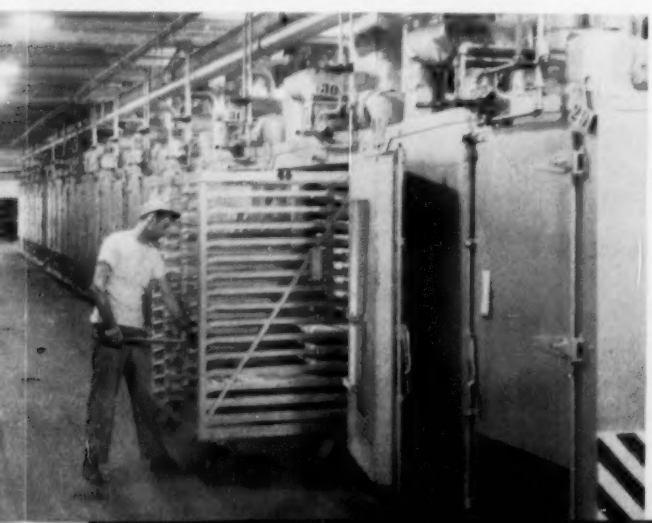


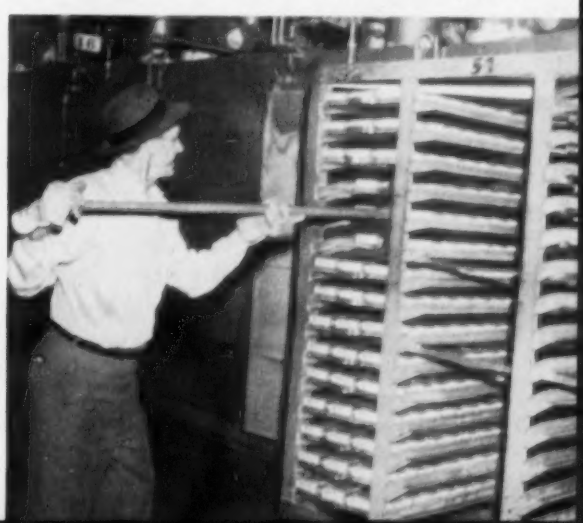
7 PNEUMATIC SEPARATORS remove skins and splits. They are fed by dewatering screens—vibrator operated (arrow).

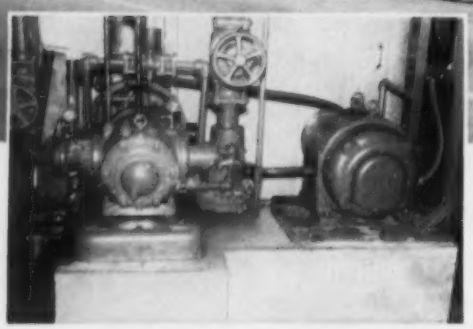


n aisle) brings tray-loaded rack of the packaged vegetables to the mptied unless replacement load is ready to go into them.

11 THREE TRAYS, each loaded with 30 packages, are slid from rack to freezer in one manual operation.







Close-up of the FES-Fuller rotary booster compressor installed by Union Dairy Farmers at Pittsburgh to convert from single to two-stage refrigeration system.

the Before and After "Capacity" Story

...at Union Dairy Farmers Cooperative, Pittsburgh, Penna.

With improvements in merchandising methods and product quality, Gilpin-Hittner Division of Union Dairy Farmers Cooperative at Pittsburgh expects to produce over 600,000 gallons of ice cream and 90,000 gallons of mix this year. Achieving this production has meant overcoming many problems – one of the most acute being refrigeration.

The plant was operating a single-stage refrigeration system and experiencing many difficulties. An FES-Fuller rotary booster compressor was installed to convert to a two-stage system. The resulting economies and increase in plant operating efficiencies exceeded highest expectations, according to J. T. Albertson, Manager of the Pittsburgh plant.

In warm weather, ice cream coming off the freezers used to be so soft that production had to be cut down. Now, since the addition of the FES-Fuller rotary compressor, both freezers operate on a full-day schedule and are producing 170 gallons per hour each – well above their rated capacity. Hardening of packaged ice cream has been reduced from 8 to 10 hours down to 3 to 4 hours. Even the texture of the ice cream has improved.

Why not investigate the FES-Fuller rotary booster in terms of *your* refrigeration needs? Write today for pertinent data. No obligation, of course.

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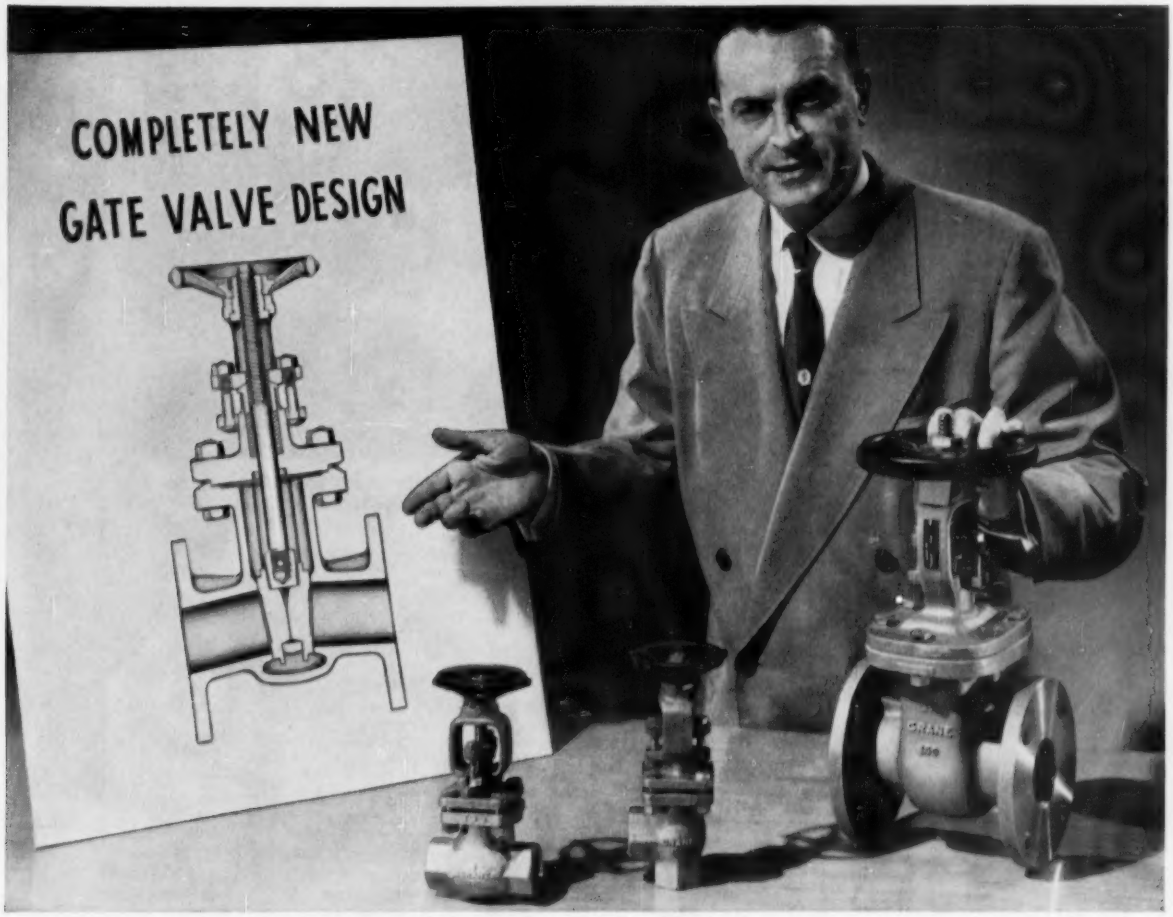
FREEZING EQUIPMENT SALES, INC., 423 WEST MARKET ST., YORK, PENNA.

Qualified distributors in principal cities

LOW TEMPERATURE FREEZING EQUIPMENT



New CRANE Corrosion-resistant valves in 18-8 SMo and Craneloy 20

Gate, Globe, Angle and Check Patterns

Few valves for process industries have ever received the quality treatment given this new Crane line—at prices you'll find O.K.

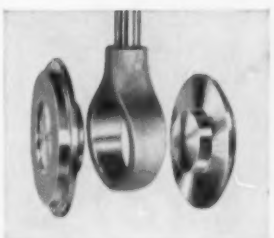
Note, for instance, the unique yet simple split-wedge disc construction in the gate valves. Those dual identical discs are free to rotate in their holder—the most effective design for resisting galling. The trunnion shape at the back of each disc assures even distribution of closing forces. You couldn't buckle them if you tried.

The globe and angle valves give equally outstanding control of corrosive fluids. A new type disc-stem connection, with minimum clearances, practically eliminates vibration. By placing seating load closer to seats, it provides easier, more accurate closure.

Check valves feature compact, thoroughly proved, non-slamming design.

Throughout, these valves are built for better service in your choice of Crane 18-8 SMo Stainless Steel or Craneloy 20. Both lines come with screwed or flanged ends.

ASK FOR THIS CATALOG—Full information including service suggestions given in circular AD-2080—available from your Crane Representative or by mail. Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers everywhere.



New split-wedge disc in gate valves combines the benefits of free rotation with uniform seat load pressure.

CRANE CO.

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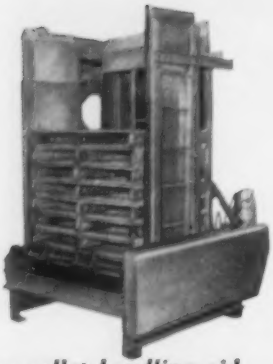
CRANE'S FIRST CENTURY...1855-1955

For more data, circle this page number on card at back →



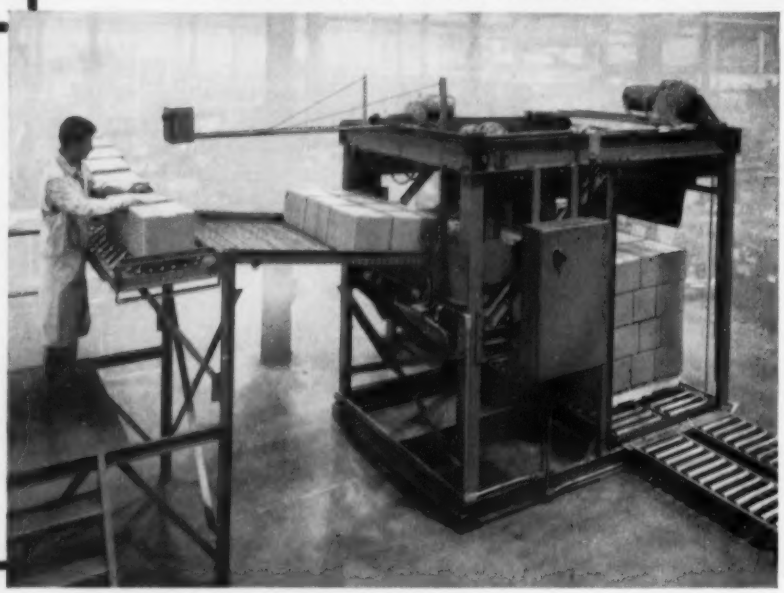
New pallet handling aid
***The Greer PALLET DISPENSER**
Eliminates manual handling of pallets on assembly and production lines. Saves space — Dispenser is the pallet storage area. Individual pallets dispensed by simple push-button release. Ask for Bulletin #55-8.

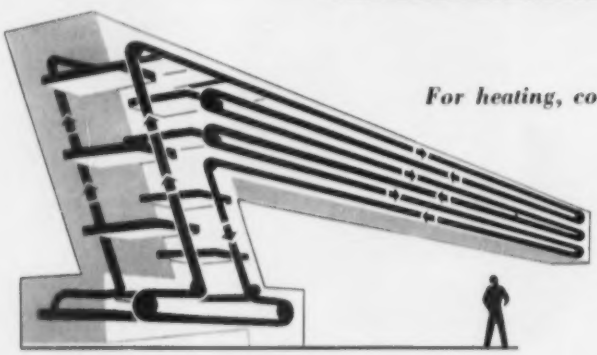
HOW GREER EQUIPMENT HELPS YOU SAVE TIME AND LABOR

For fast, low-cost pallet loading
***The PALLETIZER by Greer**

Now, one man and a Palletizer can pallet load up to three or more times faster than possible by manual methods alone. No lifting or stooping. Operator forms any pallet pattern at will. Ideal where patterns or packages frequently change. Handles cartons and boxes of all types. Write for Bulletin #55-9.

Solve production and conveyor layout problems . . . with a complete line of GREER canvas and wire-belt power Turntables. Convey products-in-process, cartons, or packages around 90° and 180° turns, always in perfect alignment. See Bulletin #54-3 through #54-9.





For heating, cooling, drying and similar processing
The MULTI-TIER

A stabilized-tray conveyor providing 10 minutes to 10 hours of processing travel in floor space as small as 15′. Automatic or manual loading and unloading. Handles wide range of processes from freezing to baking. In widths from 16 inches to 10 feet. Send for Bulletin #55-12.

J. W. GREER COMPANY

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**Sold by Authorized Dealers throughout the United States and Canada.*

GREER

Automation Creates Jobs For Workers With Skills

There is new and reassuring information for those who fear that "automation" — the control of machines by machines — will mean fewer job opportunities. It comes from a special survey of 1,574 companies in metalworking industries recently completed by AMERICAN MACHINIST, a McGraw-Hill publication. More than one-fifth of the companies reported that they already have automatic loading, transfer or assembly machinery in operation. In these companies as a whole there has been a net increase in total employment since this machinery was installed.

According to the AMERICAN MACHINIST survey, of these companies with actual experience in automation

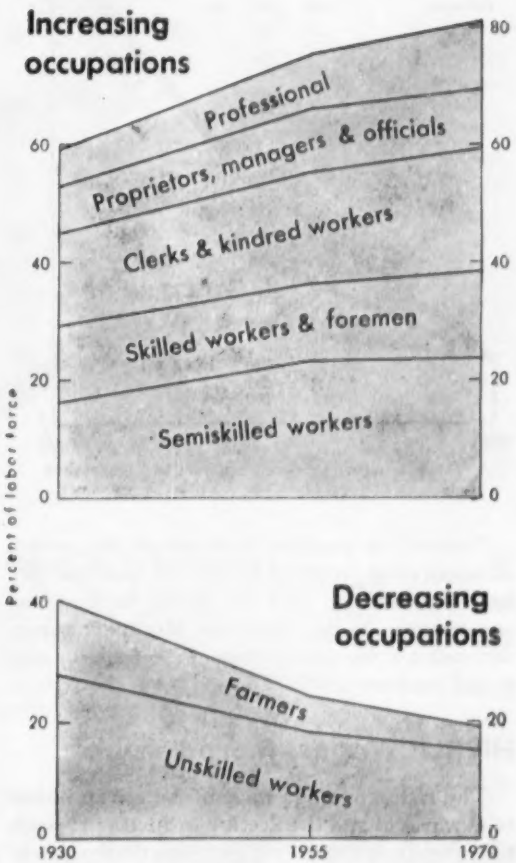
- 26% reported increases in employment averaging 21%
- 51% reported no change in total employment
- 23% reported decreases in employment averaging 16%

More Jobs for the Skilled

Of greater significance, however, is the response by 40% of these companies that they required more skilled maintenance men and by 21% of the companies that they had increased their engineering staffs. This indicates that automation is strengthening a trend already evident in the United States, a trend of expanding opportunity for those with industrial and professional skills and, relatively, of contracting opportunity for the unskilled.

The following chart shows how strong this trend has been over the past 25 years and how strong it may be expected to be over the next 15 years.

There has been a sharp decline in the percentage of unskilled workers in the nation's labor force and a corresponding increase in the percentage of those with varying degrees of skill.

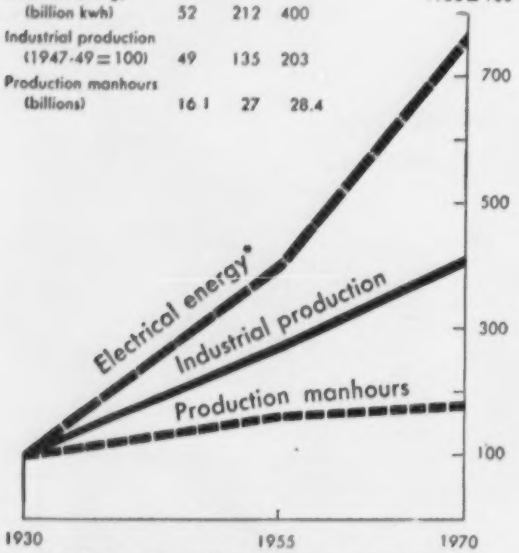


It is possible, of course, to cite cases of individuals and groups that do not conform to the charted trends. Farmers, for example, are becoming at the same time more skilled and less numerous. But this does not upset the broad proposition that opportunities are increasing for those who have skills.

Power and Production

Much of the basic explanation for the relative expansion of opportunities for those with industrial and professional skills lies in the increasing use of power-driven machinery. This has made possible a vastly greater increase in manufacturing production than in the manhours of human labor devoted to it. The following chart shows the relative increases in electrical energy and manhours of labor used in manufacturing since 1930 and the rise in industrial production.

	1930	1955	1970
Electrical energy (billion kwh)	52	212	400
Industrial production (1947-49 = 100)	49	135	203
Production manhours (billions)	16.1	27	28.4

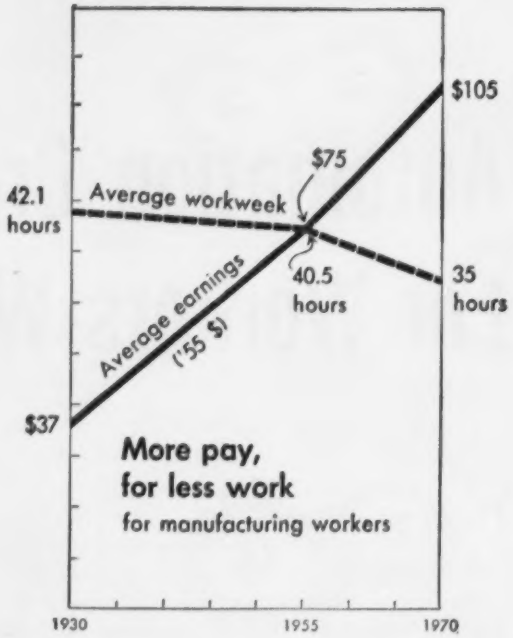


*Excludes power used in aluminum and magnesium reduction, both very heavy power users.

Power-driven machines have reduced the amount of human energy required for physical labor, but they have increased the need for skillful handling and maintenance. As the AMERICAN MACHINIST survey demonstrates, the same is true of automatically controlled machinery.

Higher Wages, More Leisure

The rising average wage of American industrial workers and the decline in hours per week that they must work reflect directly the extent to which the increase in industrial production has outstripped the manhours devoted to it. The final chart shows the increase in weekly wages (in dollars of constant purchasing power) and the decrease in the average workweek in manufacturing since 1930. It also shows the changes that may come in the next 15 years if present trends continue.



There are some who would slow what an earlier editorial in this series characterized as "the continuing process of taking dull and laborious work off the backs and minds of men and transferring it to machines operating in large batteries under automatic control." In doing so, they might make the world safer for those with no skill. The far more constructive course is to welcome the expanding opportunities now being provided and be sure that the nation's young people, who are now starting another school year, are prepared to take advantage of them.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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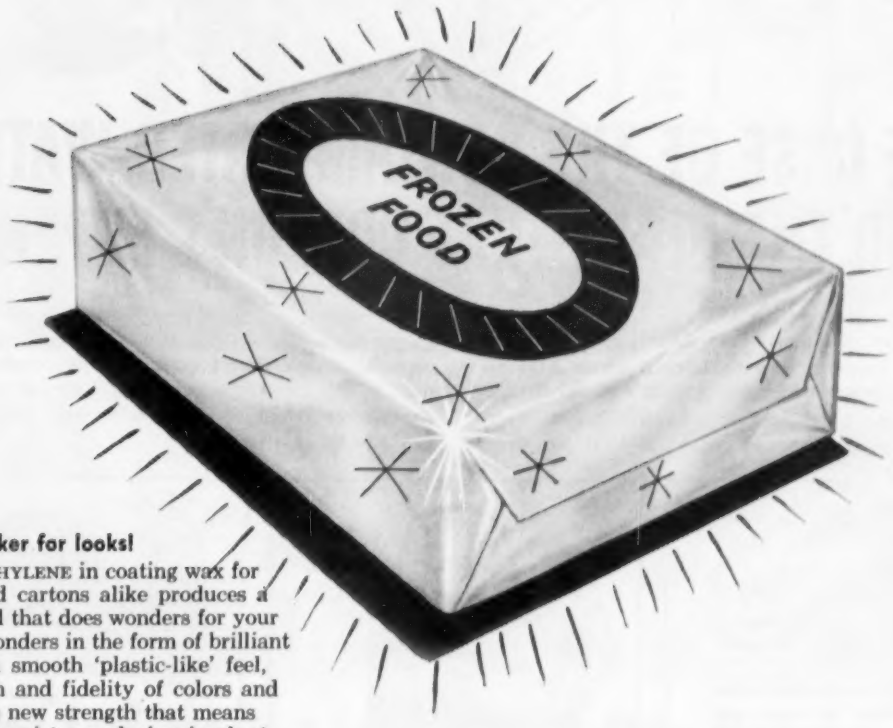
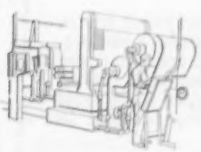
get the new 'plastic-like' finish

at less cost



Wonder-worker for looks!

A-C POLYETHYLENE in coating wax for wrappers and cartons alike produces a coating blend that does wonders for your packages. Wonders in the form of brilliant high gloss, a smooth 'plastic-like' feel, greater depth and fidelity of colors and a remarkable new strength that means greater scuff resistance during in-plant and in-store handling.



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- *varnish type coatings*
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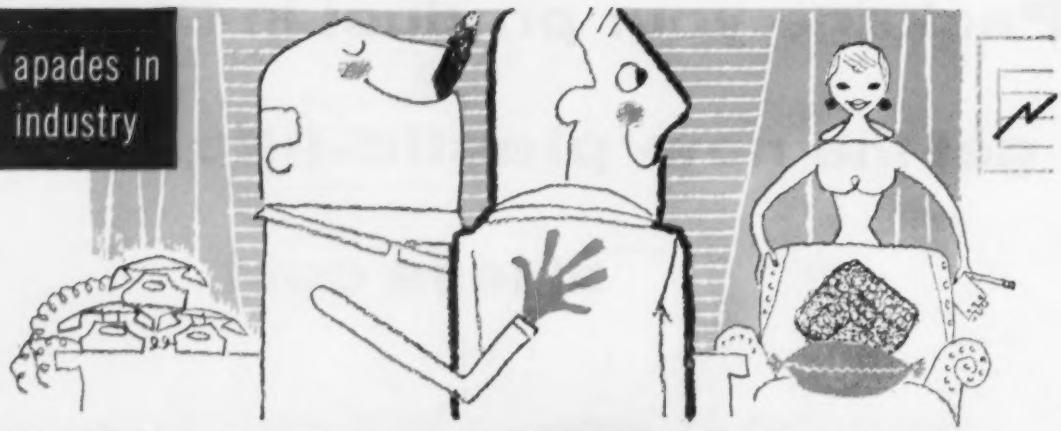
S/K apades in industry

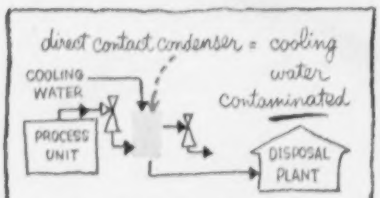


THE CASE OF THE CONTAMINATED WATER AND THE PLANT THAT COULDN'T EXPAND

A plush, private office and a beauteous secretary for Wilmer, the newly created Big Wheel!

Wilmer found a way to blitz a waste disposal jinx that was road-blocking plant expansion.

Top Brass at the food processing plant where Wilmer worked wanted to add new vacuum processing units. But that meant more waste—and the disposal plant was already operating near capacity. Also, direct contact type condensers, used in the two-stage steam jet vacuum pumps, contaminated all cooling water and added to the volume of waste.



PUZZLE: how to expand without increasing the capacity of the disposal plant or exceeding the legal amount of waste that could be dumped into streams.

Wilmer didn't dawdle—he doodled. His sketch of the existing vacuum pump installation looked like this. Eliminate contamination of cooling water and there'd be far less waste to get rid of. But how?

Schutte and Koerting new Bulletin 5-H2 on "Two-Stage Steam Jet Vacuum Pumps" suggested an answer. Surface condensers in place of the direct contact units would end contamination of cooling water. Wilmer picked up the phone and called the nearest SK Sales Engineer.

The SK Engineer arrived on the double. He took a close look at the situation and promptly worked out design details for replacing direct condensers with surface condensers—on units already installed.

PLANT EXPANSION ACCOMPLISHED . . . WITHOUT DELAY.
With cooling water being recirculated instead of discharged to stream, the waste disposal plant is not overloaded. Additional process units have been installed with new SK stainless steel vacuum pumps. And Wilmer is sitting pretty in his new job.

MORAL:

Send for your copy of new Bulletin 5-H2 containing technical data on two-stage units—part of SK's complete line of steam jet vacuum pumps. And be sure to call a qualified specialist on jet apparatus—your SK Sales Engineer—on any problem that needles you.

Schutte and Koerting
COMPANY
MANUFACTURING ENGINEERS
2223 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

Jet Apparatus • Heat Transfer Equipment
Strainers • Condensers and Vacuum Pumps
Oil Burning Equipment • Rotameters
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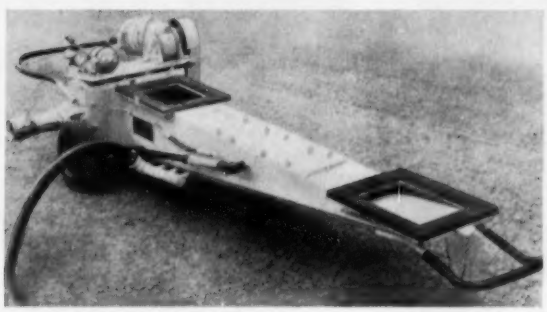
Desuperheaters

NEW EQUIPMENT & SUPPLIES



Portable Transfer Unit Extends Bulk-Flour Delivery

Commercial bakeries remote from flour distribution centers and without adjacent rail sidings can now take advantage of the economy and convenience of bulk-flour delivery with use of a new portable unit.

Device is designed for pneumatic transfer of flour or other bulk ladings from Airslide rail cars (General American Transportation Corp.) to special bulk vans or storage bins. Transfer mechanism is a unique combination of an air-activated gravity conveyor (Airslide) and a pressure-type conveying system (Airveyor). Former fluidizes the flour for charging into the conveying system by a blow-through feeder.

Unit (left) is well balanced and can be maneuvered by one man. It is mounted on running gear which consists of two wheels fitted with pneumatic tires and tapered roller bearings. Hydraulic rams actuated by hand pump extend or retract the gear to raise or lower the transfer unit. Compact device is 10 ft. long, 40 in. wide, and weighs 700 lb.

In operation, it is pushed underneath the rail car (right) and its gasketed 9x12-in. inlet openings are lined up with car outlets. The flanged opening at unit's shallow end is clamped to car outlet flange, lightly compressing the gasket. Next, running gear is extended to jack entire unit upward against the car. This compresses the soft rubber gasket to seal the connection.

Then a few additional pump strokes force hydraulic fluid into an accumulator to provide a reservoir of oil. As car rises on its springs during unloading, fluid in the accumulator is expelled into the hydraulic cylinders. As a result, transfer unit follows the car upward to maintain initial sealing pressure at the outlets.

With transfer unit in place, 3-in. flexible rubber hoses are connected to blowers mounted on the trailer van (top photo). Air is blown through to activate conveyors in the rail car and transfer unit. The porous membrane through which air passes to fluidize the flour is silicone-impregnated fabric.

Air-activated flour then flows by gravity down the sloping Airslide conveyor to the blow-through feeder, which is driven by an aluminum-frame lightweight gear motor. Flour is blown from the feeder pockets into the van through a 3-in. hose.

Electric power for operation of the transfer unit is delivered from plant source by way of plug-in on van's control panel.—*The Fuller Co., Catasauqua, Pa.*

Circle 129A on Reader Service Card

Offers Adsorbents to Cut Packaged-Food Spoilage

Packets of activated carbon and silica gel are being used to preserve freshness in packaged food such as

potato chips and candy, and to prevent development of mold on onions.

Called Magic-Paks, they are 2-in perforated envelopes of cellophane and glassine. Tests indicate that sealing one packet inside a potato chip bag extends freshness and crispness of the chips for up to two weeks.

Effectiveness depends upon the desiccating power of silica gel and the adsorptive capacity of activated carbon for odors, vapors, and gases. One cubic inch of a typical pelleted form of this carbon has an active surface of more than 88,000 sq. ft. It is mechanically strong, non-dusting, and resists breakage during handling.—*Gordon Foods, Inc., 2196 Brookview Dr., N.W., Atlanta, Ga.*

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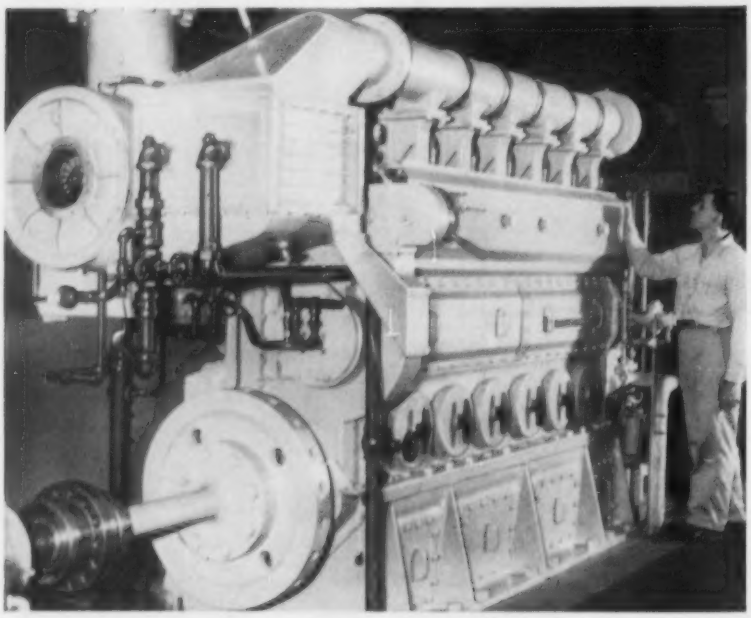

New Engine Design Offers Efficient, Clean Operation

To meet demand for compact heavy-duty, continuous-service engines in smaller sizes, this 4-cycle unit delivers 400-1,400 hp. at speeds up to 1,000 rpm.

Called W9, the engine is equipped for high-pressure turbocharging. It has a 9-in. bore, 11-in. stroke and is structurally designed for continuous operation at more than 200 psi. bmep.

For high efficiency and economy, it can use low-cost fuels such as residual, crude, and distillate oils, natural gas, sewage gas, manufactured gas, or propane.

Compact design plus a low-weight-per-horsepower ratio permit low building, foundation, and installation costs. Unit is also adaptable for portable or semi-portable applications such as trailer or rail-car mountings.

Engine can be arranged as a drive unit from either end, and may be equipped with standard clutches, hydraulic couplings, or torque converters. Its welded-steel frame permits use of cast-iron cylinder liners with water jackets cast integrally. Cooling water does not contact the frame, thus preventing corrosion, or leakage into the crankcase.

Crankshaft is hung from the frame, secured by cast-steel main-bearing caps, and uses removable bearing shells. Base provides means for mounting the engine, and also serves as a lubricating-oil sump in stationary applications.

Intake-manifold, located at top, discharges air into inlet passages (Jet-Swirl), which are cast into the cylinder head and fulcrum-lever brackets.

Incoming air enters the cylinder in a direction almost parallel with the inlet-valve stem. Inlet design gives air a swirling action to provide rapid mixing of air and fuel for efficient and clean combustion.

Large inspection doors and covers facilitate routine maintenance of internal parts. And oversized bearings on main, crankpin, wrist-pin, and cam shafts reduce bearing pressures.—*Worthington Corp., Harrison, N. J.*

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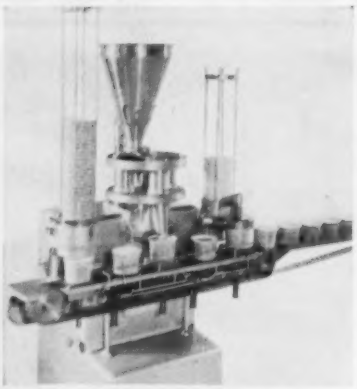

Versatile Filler Handles Free-Flowing Items

Dry, free-flowing products such as beans, peanuts, or bread crumbs may be automatically packaged in nesting-type round containers with a new portable filler (Model 441).

Cup dispensing and capping equipment is similar to that used for ice cream. In operation, a container is dropped automatically from cup dispenser, conveyed to filling station, filled, carried to capper, and is then closed.

Illustrated unit filled 16 oz. containers, but numerous variations of capper and dispenser are available to cover a wide range of cup sizes. Lids may be of many types—insert, window, tab, or cover all.—*Anderson Bros. Mfg. Co., 1907 Kishwaukee St., Rockford, Ill.*

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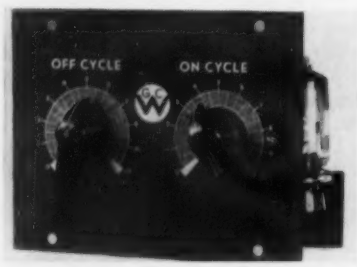

For Accurate Cycling: Adjustable Timer

Process control and automatic weighing and filling operations are applications for an electronic repeat cycle timer, designed for accurate and adjustable cycling with minimum power.

Called Model No. 4, small lightweight unit provides two timed intervals occurring in sequence. On and off cycles may be adjusted from 0.1

to 12 sec. Operation is continuous with application of power.

Timer uses two miniature cold-cathode gas triodes. No filament power is consumed and no warmup is required. Only moving part is a simple electro-magnetic relay with 5-amp. contacts. Power supply is 105-125 v., 25-400 cycles.

Unit is available for panel mounting or in a 3 x 4 x 5-in. box.—*G. C. Wilson & Co., 1915 Eighth Ave., Huntington, W. Va.*

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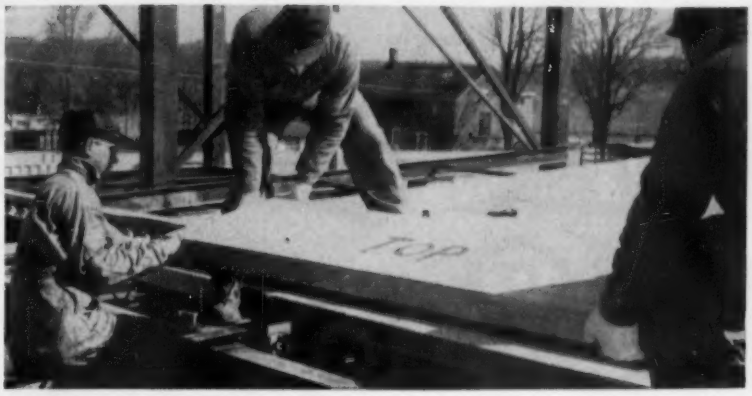

Resists Fire, Heat-Transfer, and Water Absorption

This lightweight structural material, made of sand, lime, cement, and fly ash, was originally developed for use as a roof deck or core material for fireproof doors and partitions.

But it's thermal-insulation properties and resistance to water absorption reportedly also suit it to freezer-room construction—without need for additional insulation. The "U" factor for the product ranges from .17 to .22, depending upon thickness.

Known as Calsi-Crete, materials' high moisture resistance is attributed to its non-connected air pores. In ice-box condensation tests, a 3-in. plank of this material was cyclically exposed to temperatures of 15 F. and 75 F. (latter at 80% relative humidity) for eleven days.

In this test, water absorption was only .07%, and there was no condensation line or ice formation.

Resistance to fire was demonstrated by subjecting a door, utilizing this product for core material, to a temperature of 1700 F. for 1 hr. Although the veneer finish was completely burned from the door, the core withstood both the fire and a subsequent stream of water.

Material's weight ranges from 18 to 40 lb. per cu. ft., depending on end use. Flexural strength is 175 psi., compressive strength 800 psi., and modulus of elasticity 250,000 psi. It is inert, dimensionally stable, and may easily be sawed, cut, or nailed. Further, it is a good key for plastering, and is vermin-proof.—*Jackson & Church Co., Saginaw, Mich.*

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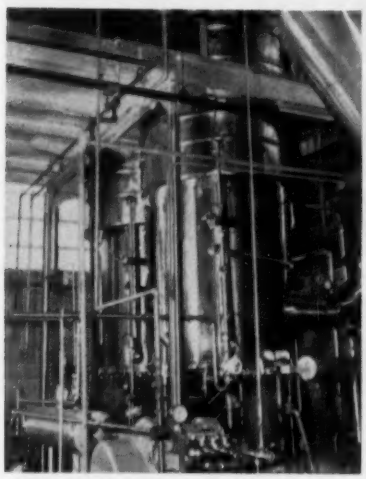


Evaporator Cuts Costs And Protects Flavor

Continuous flow, low-temperature operation, and short transit time are advantages of a new six-stage jet evaporator called Multi-Stage Jet. In addition unit reportedly saves up to 75% of the steam and water costs of single-effect evaporation, thus increases overall efficiency.

Applications include concentration of dairy products and fruit juices at temperatures that eliminate off-flavors. With heating medium in first effect at 165 F., temperature is 135 F., and 100 F. in second effect. Evaporation to high density takes place in one unit with low entrainment loss. Furthermore, no pumps are required, operation is automatic, and unit is easily cleaned.

Evaporators are available in four capacities. For example, in concentrating skim milk from 8.8 to 42% total solids, they handle from 1,378 to 16,534 lb. per hr. of raw product. Water evaporated is 1,089 to 13,070 lb. per hr.—*Mojonnier Bros. Co., 4601 W. Ohio St., Chicago 44.*

Circle 131A on Reader Service Card

New Harvester Boosts Pea Quality, Cuts Costs

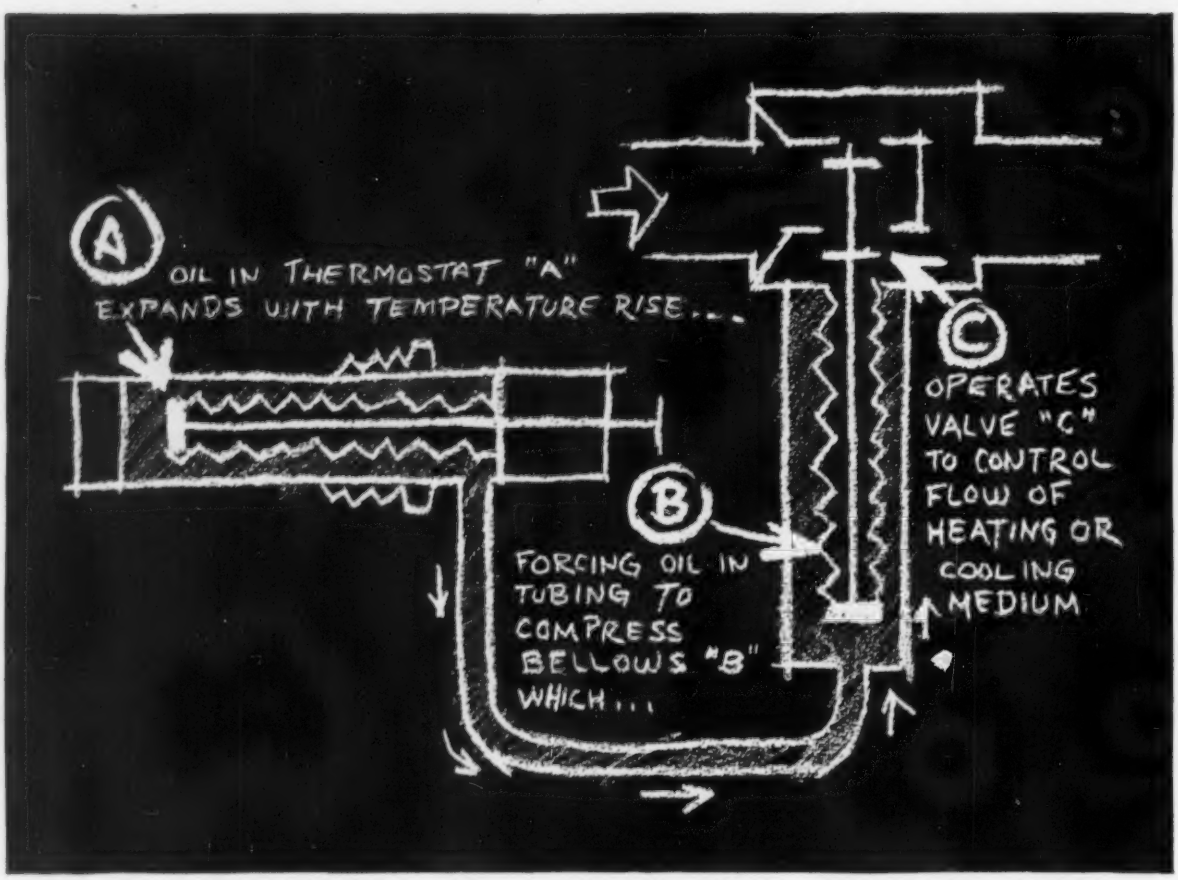
Use of this pea-pod harvester reportedly ups product quality, increases yield, and cuts operating costs.

Better quality results as action of unit curbs harmful effects of field vining and reduces transport time from field to plant. Pods can be sent directly to cannery for opening, or to controlled storage if necessary to accommodate the load.

Higher yield is obtained since there are fewer splits and bruised peas by this vining method. Furthermore, a potential increase in subsequent yield is seen by spreading vines and leaves on the land as fertilizer.

Cost savings are cited in the elimination of swathers and loaders. And with no masses of vines to handle, trucking and vining times are curtailed.

In operation, the self-propelled harvester (left photo) cuts vines in a 9-ft. swath. These are conveyed to


A
OIL IN THERMOSTAT "A" EXPANDS WITH TEMPERATURE RISE...
B
FORCING OIL IN TUBING TO COMPRESS BELLOWS "B" WHICH...
C
OPERATES VALVE "C" TO CONTROL FLOW OF HEATING OR COOLING MEDIUM

Automatic Temperature Control

AS SIMPLE AS A-B-C !

And what could be simpler!

Just take another look at that rough sketch. That's all there is to it. A simple thermostat – a length of tubing – a valve. That's all!

That's the trouble-free design of the Sarco SELF-POWERED temperature control. And each year, thousands give accurate service in all industries ...for firms such as Colgate-Palmolive Company, Sinclair Refining Company, Swift & Company.

These temperature controls are simple, inexpensive, dependable, effective. No highfalutin gadgets that take a technician to read and a specialist to fix! Self-contained—no exposed mechanism. Packless. No outside power connections. Can be installed by any pipe-fitter.

And you'll find these temperature controls wonderful for about 85% of your jobs...all but those few specials that call for elaborate, costly control.

Cost? Mighty low! For example, the ½" size is yours for about $100. It's good economy to specify AUTOMATIC temperature control for ALL control jobs, not just the big ones.

SARCO COMPANY, INC.

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

Please send information on your simple, inexpensive temperature controllers:

☐ Self-powered type for use on_____

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Name_____

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four cutter beds (right) equipped with rotating banks of saw-toothed disks. Teeth in the disks are shaped to pick up vines and leaf stems, but interstices are too small to encompass the greater diameter of the full pod, thus does not injure it.

To assure constant cutting action and to prevent clogging of vines in the cutter beds, fingers or forks are arranged above to depress vines between disks and move them forward during the pod-shearing cycle. Rotation banks carry vines through three points of shear to chop them thoroughly.

Pods and refuse drop down between the disks to a draper belt, where they are separated by air blast. Pods move toward a transverse belt at the rear, which conveys them to a truck or into a hopper. Chopped material, discharged by air at rear of unit, may later be recovered for ensilage or left as fertilizer.—*E. H. Carruthers Co., Equipment Engineering Div., Warrenton, Ore.*

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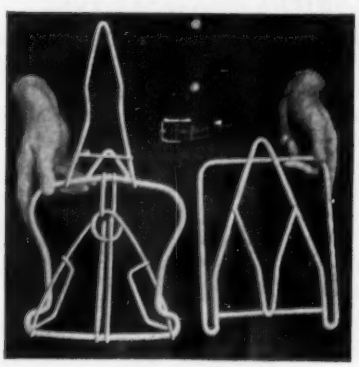

Welded-Wire Shackle Eases Bird Handling

Seen cutting costs and simplifying handling in chicken processing plants is a welded-wire shackle (right), offered as a replacement for the spring-action type (left). Latter is said to require fatiguing compression of a strong spring for insertion and removal of a chicken on the assembly line.

New unit, on the other hand, has two tapering slots into which legs reportedly are easily inserted and held securely by bird's own weight. A "V" shape in the center holds the chicken's head for other operations.

Shackles are available in stainless steel for corrosive service.—*E. H. Titchener & Co., 67 Clinton St., Binghamton, N. Y.*

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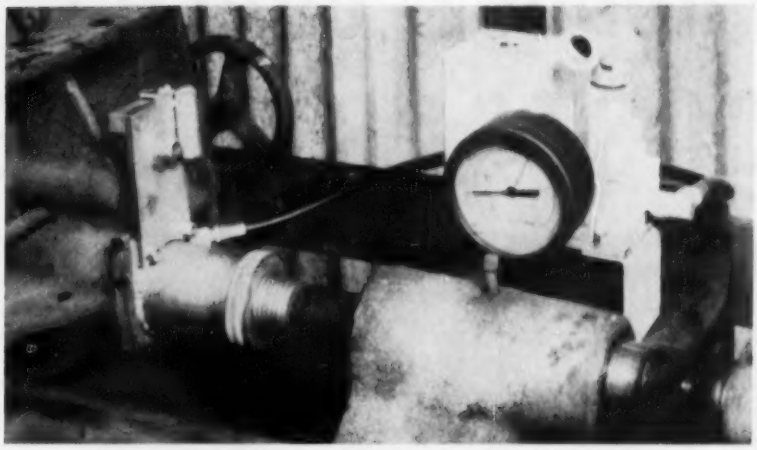


Unit Converts Filter Press to Hydraulic Closing

Any mechanically-operated filter press may quickly be converted to hydraulic operation with an easily installed closing device that minimizes down time. Moreover, no press-opening space is lost in accomodating the converter unit, called Hydro-Lock.

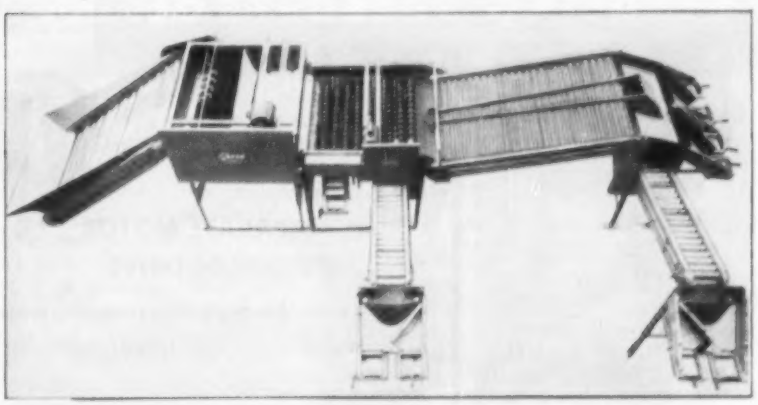
The only machining required for field installation is drilling and tapping of four small holes to mount the pump on the crosshead. The same bolthole that mounts the pillar block is used for the closer. Latter consists of a hydraulic ram that replaces a thrust or pillar block and pushes against the closing screw. Hydraulic fluid for the ram is applied by a manually-operated pump.

To permit accurate closing to any required tonnage, a 4½-in gage calibrated in pressure as well as total tons, is mounted on the pump. An adjustable red pointer on the gage can be set to any desired value so that given settings may easily be repeated.

Unit is designed for safe "one-man" operation. All contacts are hard-chrome plated for corrosion and wear resistance. A spring returns the ram automatically. Further, there is a pressure-safety valve and built-in positive stop to prevent accidental overstroke.

Five standard models are available with capacities ranging from 30 to 120 tons, strokes from 3 to 6 in. Units with longer or shorter strokes can also be supplied, as well as a double pump to provide higher approach speed—*Biach Industries, 10 Indian Spring Rd., Cranford, N. J.*

Circle 133B on Reader Service Card



Complete Potato, Onion Line Ups Process Efficiency

With compact and efficient systems, such as this new 30-in. line, processors can clean, size, sort, and pack onions or potatoes in one fast, continuous operation. Other advantages cited are time and labor savings, plus gentle handling and accurate sizing that produce a top-quality pack.

Key units are a cleaner (Washer-Absorber) and a sizer (Rubber-Spool).

PRODUCT QUALITY IMPROVED COSTS REDUCED WITH

STERLING SPEED-TROL!

Since installing Speed-Trols on our automatic candy brushing and polishing machines, reports J. R. Flanagan, Plant Engineer, Stephen F. Whitman & Son, Inc., manufacturers of Whitman's Chocolates, we have increased production ... improved quality and appearance of our candy ... decreased spoilage ... and reduced maintenance and labor costs. These advantages result from Speed-Trol's accurate speed regulation, wide speed range and infinite speed variation, which permit synchronization of machine speed with the candy conveyor belt.

STERLING SPEED-TROL GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

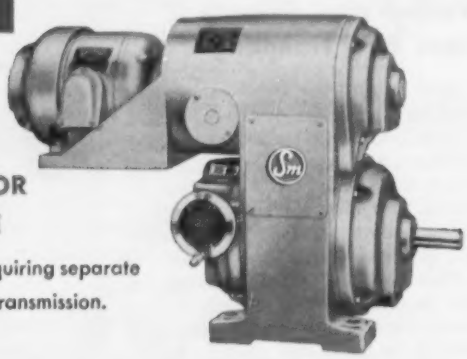
EQUIPMENT ADAPTATION TO: Sequence synchronization—operators' abilities—load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

PROCESS CONTROL OF: Temperature—viscosity—level—pressure—flow—etc.

TIME CONTROL OF: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality and profit.

OVER 60 ILLUSTRATIONS
showing how Sterling Electric Power Drives reduce production costs. Write for Bulletin No. 201-A



SEPARATE MOTOR SPEED-TROL DRIVE

For applications requiring separate motor and variable speed transmission.

STERLING ELECTRIC MOTORS

Plants: New York City 51; Chicago 35; Los Angeles 22; Hamilton, Canada; Santiago, Chile

Offices and distributors in all principal cities

Former employs washing brushes with long pintle rubber tips that scrub potatoes thoroughly under a continuous spray of water from overhead nozzles. Rinsed potatoes then pass over absorbing rolls to remove excess water. Rolls are covered with sponge rubber and canvas, and wrapped in inexpensive replaceable toweling.

The sizer has two sections of smooth rubber spools, engineered to give accurate, gentle separation of any two predetermined sizes. Latter go directly to bagging stations. Remaining potatoes or onions pass over spools to a sorting table, where "pick outs" can be hand-sorted into a special center lane. Selection of adjustable spool sizes allows any two of 12 variations from 1¼- to 3½-in dia. in the sizer sections.

Loading elevator, cleaner, grader, sorting and delivery tables, and baggers are available in 18, 30, and 42-in widths. Units may be purchased separately or as a complete assembly.—*John Bean Div., Food Machinery & Chemical Corp., Lansing 4, Mich.*

Circle 133C on Reader Service Card

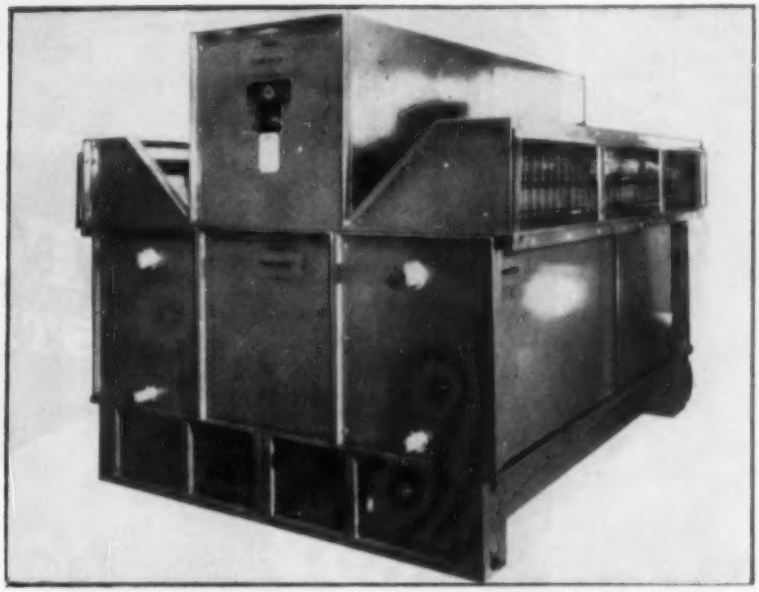
New PVC Fittings Permit Larger Piping Systems

Threaded and socket-type pipe fittings of unplasticized polyvinyl chloride (PVC) are now being injection-molded in diameters of 3 and 4 in. Included are 90- and 45-deg. elbows, tees, couplings, and flanges.

Such fittings now enable economical erection of larger-size PVC piping systems. They are finding applications in food plants handling highly corrosive materials, like vinegar. Installations are termed relatively inexpensive where the corrosion problem is acute. In addition, fittings have smooth interiors that offer desirable flow characteristics.

Maker also supplies a line of plug-type plastic valves and fittings, from ½ in. up.—*Tube Turns Plastics, Inc., 224 E. Broadway, Louisville, Ky.*

Circle 135A on Reader Service Card



Evaporative Cooler Has Close Temperature Control

Designed to conserve water in industrial cooling applications, this heat exchanger (Panel Casing Aero) offers temperature control within 2 deg. F. It cools water by evaporation and regulates temperature by modulating the use of outdoor air.

Units may be installed anywhere, although usual location is outdoors, on the ground or roof. Four sizes afford capacities from 7 to 18 million BTU per hr. under standard conditions. Floorspace requirement is 194 x 140½ in., height is 128⅜ in.

Fluids to be cooled flow through two parallel-mounted coil sections kept drenched with a water spray. A portion of this water evaporates while the balance is recirculated by pump. Air enters through dampered intakes above coils, travels downward through sprays, and enters a central plenum between the two sections, at which point entrained moisture is eliminated. Air then moves upward to be ejected to the atmosphere by a propeller fan.

Water in the coils is effectively cooled to a point close to atmospheric wet bulb temperature. About 1,000 BTU are transferred through the wet coil surface to the air stream for every pound of water evaporated. And action of air-recirculation system holds temperature constant.

Cooling capacity varies directly with heat-input load. Gradual action of dampers, admitting more air when greater cooling is required, controls evaporation of water spray and holds desired temperature without "hunting." If heat is required instead of cooling, it is provided either with steam or electricity by a heater in spray-water tank.

Equipment is designed for assembly at installation site. Since casing is shipped as flat panels instead of box-like shapes, ratio of space to weight, and freight bills, are lowered.—*Niagara Blower Co., 405 Lexington Ave., New York City 17.*

Circle 135B on Reader Service Card

Portable Lab Kit Speeds Test for Water Bacteria

Bacterial analysis of water in 18 hr. —instead of the 2-4 days conventionally required—is now possible with use of a new portable laboratory developed especially for field use.

Called Sabro, it contains all essential equipment for quantitative analysis. In operation, a quantity of water is passed through a circular membrane filter, which retains bacteria on its surface. After addition of nutrient media, and proper incubation, a visible count of original number of coliform

handles between 300 and 400 cans per minute at lowest cost

Here's a machine that's designed to meet today's increasing demand for high-speed can-making production at lowest cost . . . the Hamilton 301 Can Tester. This automatic air-pressure tester is capable of speeds between 300 and 400 cans per minute. It is adaptable to test either open-top or vent-hole types of finished cans with diameters up to 4¼" and heights up to 7⅜".

One big feature of the Model 301 is the use of open pockets rather than buckets or pots. This greatly reduces the cost of change parts for the machine. The testing principle of this machine is unique and in stepped-up can-line operation the No. 301 has proved again and again its exceptional ability to detect and reject leakers.

In addition, you'll find this model fully equipped with all the latest safety devices including a spring-loaded ball slip clutch, brake motor and electrical controls.

Why not investigate now the 301 Can Tester and other machines in Hamilton's complete line of modern . . . high-speed . . . cost-cutting can-making machinery. Please address: Hamilton Division, Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio.

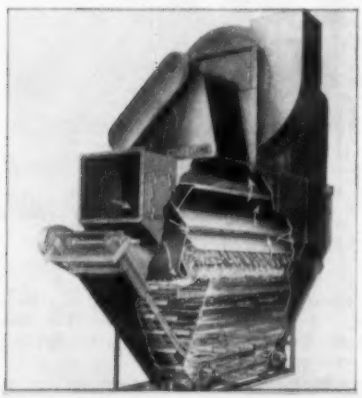
BALDWIN BLH LIMA-HAMILTON

Hamilton Division
BALDWIN-LIMA-HAMILTON

bacteria is possible. Moreover, filters can be treated to provide permanent records.

Technicians can be quickly trained to perform the analysis, and normal sanitation measures are sufficient for accurate data.—*Salem-Brosius, Inc., Hyla Div., Sharpsburg, Pittsburgh 15.*

Circle 135C on Reader Service Card



Redesigned Dust Collector Reduces Maintenance

Recent improvements in this line of dust collectors offer increased flexibility for a wide range of operating conditions, plus redesigned components that reduce maintenance.

Units (Type N Roto-Clone) are available in 15 sizes with ratings of 750 to 50,000 cfm. Dust is removed by combined action of centrifugal force and a thorough intermixing of water and dust-laden air. Simplified water entrainment separators and additional access doors with improved hinges permit easier inspection and maintenance.

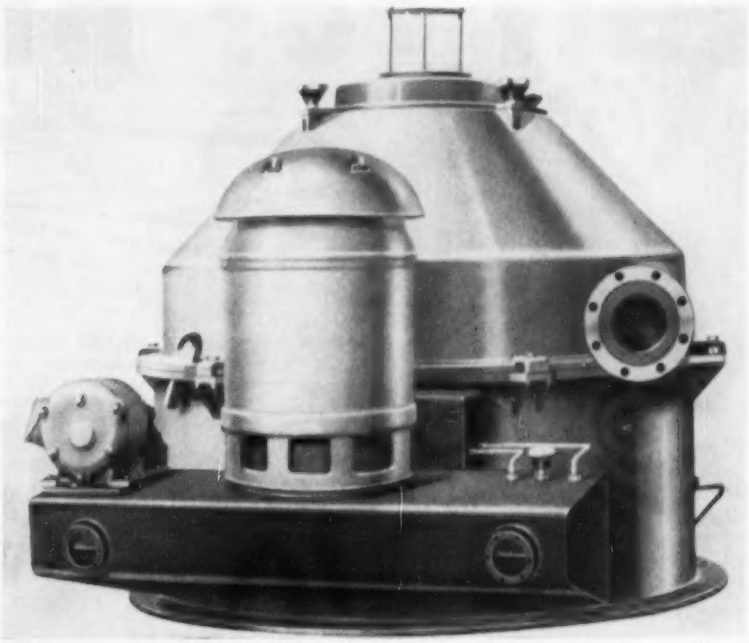
In operation (arrows), air flows through the stationary impeller at high speed, carrying water in a heavy turbulent sheet. Centrifugal force, exerted by rapid changes in direction of flow, permanently traps dust particles in the water film. Water is continuously reused and, since the water curtain is produced by air flow, no pumps or nozzles are required.

Regardless of air volume, water level remains the same on the clean-air side. As air flow reduces, pressure loss through the impeller decreases, and make-up water raises the water level on the dirty-air side. This higher operating level throttles the air passage in the impeller and increases velocity through the narrow opening.

Therefore, air with substantially constant approach velocity impels the same volume of water through the passages. Thus, scrubbing action and collection efficiency are maintained at reduced air flow.

In addition, three hopper arrangements permit selection of most convenient disposal method. These are: (1) A flat-bottom design for manual removal, (2) a hopper with drag-type ejector for automatic dewatering and sludge removal, and (3) a pyramidal hopper for sluicing collected material to process or disposal point.—*American Air Filter Co., Louisville 8, Ky.*

Circle 137A on Reader Service Card



Continuous Separator Has New Centrifugal Screen

This liquid-solid separator employs a new principle of centrifugal separation that combines the action of centrifugal force with that of a positively-fed screen of increasing diameter. Result is said to be an efficient and lower-cost method of continuously separating slurries into filtrates and dry solids at high feed rates.

Designated "Mercone", unit may be used for dewatering, production of a dry cake, clarification, or segregation of pulps. Furthermore, two or more of these steps can be accomplished simultaneously.

Feed is by gravity at the top, and filtrate is spun through the screen by a force of some 1,800 C. G's (centrifugal gravities). Solids are conveyed along the screen to be discharged below in a dry state. A helix is employed to move solids along the screen surface and prevent blinding. Screen and helix operate at positive differential speeds by means of a special drive, while the screen is supported by a perforated cone.

For permanent installation, this machine requires only a simple foundation. And for test purposes, it can operate without a foundation because of accurate balance and light weight of the rotating mass.

Unit is available in 20- and 30-hp. ratings, with speeds of 2,400, 2,800, and 3,200 rpm. Overall height is 50 in., length 77 in., and base diameter 54 in. Shipping weight is 3,100 lb.—*Merco Centrifugal Co., 150 Green St., San Francisco 11.*

Circle 137B on Reader Service Card

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REDLER

Conveyor-Elevators Move

salt for brine

at Armour

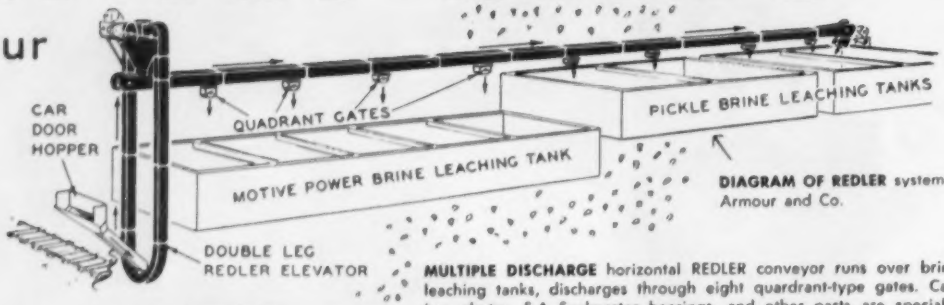
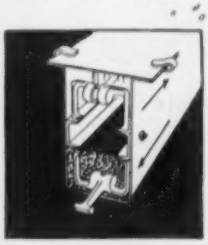
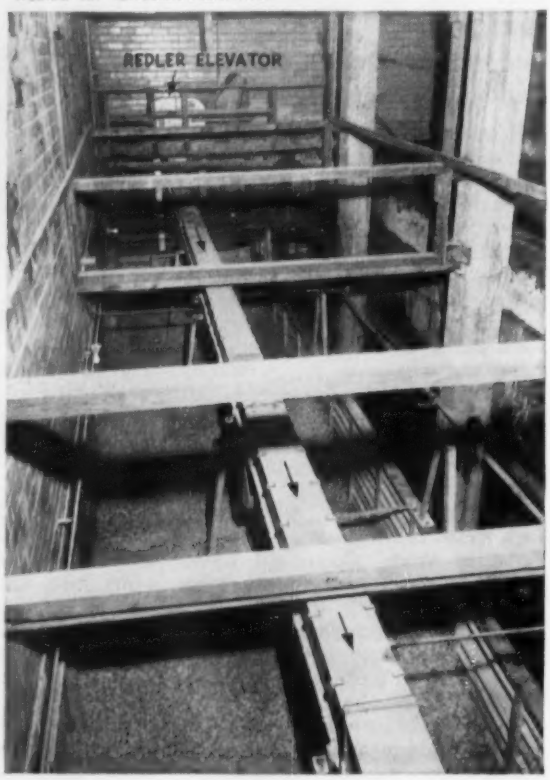


DIAGRAM OF REDLER system at Armour and Co.

MULTIPLE DISCHARGE horizontal REDLER conveyor runs over brine leaching tanks, discharges through eight quardrant-type gates. Casing, chutes, S-A Sealmaster bearings, and other parts are specially treated for corrosion resistance.



SECTION THROUGH REDLER CONVEYOR shows how material is moved in jam-proof, sealed flow.



Rock salt moves from box cars to brine leaching tanks at Armour's St. Paul, Minn., plant quickly and at low cost—thanks to S-A REDLER Conveyor-Elevators. The REDLER system shown at right and diagramed above is the third at this plant. Two others have been successfully handling the highly corrosive salt since the early Thirties.

There's a good possibility REDLERS are the best answer to *your* bulk handling problem, too. Features include sealed conveying in any direction without dust, jamming, degradation or contamination. Write for full details.

An experienced S-A engineer will be glad to advise you on any phase of bulk materials handling. No obligation.

SINCE 1901 S-A STEPHENS-ADAMSON MFG. CO.

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Specialists in the design and manufacture of all types of bulk materials conveying systems

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A complete line of conveyor accessories, centrifugal loaders—car pullers—bin level controls

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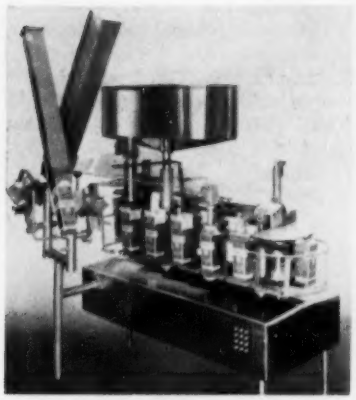


Small Plant Filler-Sealer Handles Nested Cartons

Designed for lower-cost container filling in the smaller milk plant, this unit automatically fills, closes, and hermetically seals maker's preformed nested cartons. Latter save considerable shipping and storage space.

Called Model "ON" Filler-Sealer, it may be adapted for all container sizes from ½ pt. to ½ gal. Production is 15 cartons per minute in a one-man operation, while sanitary design of the machine minimizes clean-up time and maintenance.

Unit requires floor space of 6x6 ft., and is equipped with single-phase motor (½ hp., 60 cycle, 110-220v.), waterproof switch, and heater assembly with thermostatic control.

Maker also offers a similar Model "O" for use where standard blanks are converted into formed cartons.—*Pure-Pak Div., Ex-Cell-O Corp.*, 1200 *Oakman Blvd., Detroit* 32.

Circle 139A on Reader Service Card

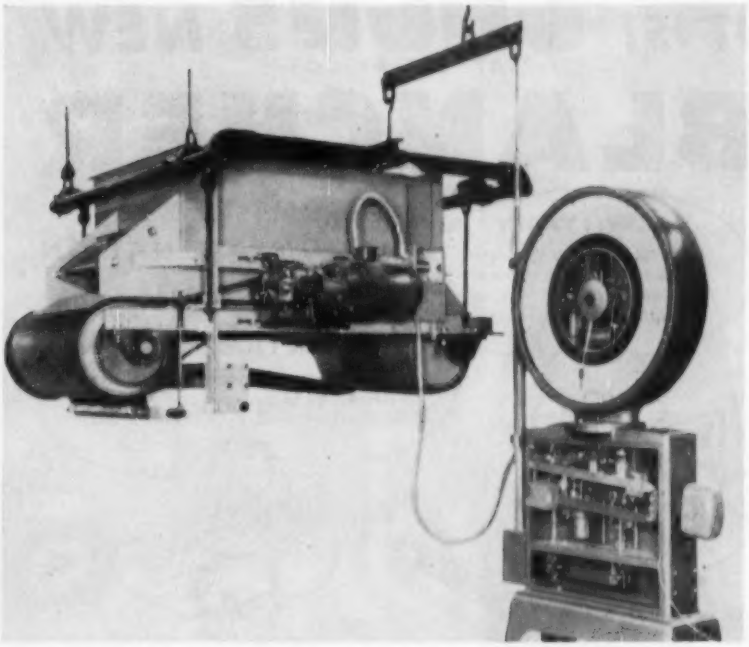
New Glass Electrodes Cover Full pH Range

A new type of pH-sensitive glass, termed especially suited for high-pH measurement, now replaces that formerly used in maker's blue-tipped, alkali-resistant electrodes.

In addition to operating above pH 10, electrodes with new glass formula (Type E-2) cover entire 0-14 pH range at temperatures from 15 to 100 C. They offer improved resistance to acids, alkalis, surface deterioration, and aging.

Units are available for use with maker's Models G, M, N, H and H-2 pH meters, and industrial pH flow and immersion assemblies.—*Beckman Instruments, Inc., Fullerton, Calif.*

Circle 139B on Reader Service Card



Differential Scale Delivers Hard-to-Handle Items

Sticky and non-free flowing materials reportedly may be weighed as accurately as dry aggregates with use of a new-type automatic scale.

Unit is a weigh-in & weigh-out scale comprising weigher, dial scale, and totalizer. Weigher, consisting of a weigh hopper mounted on a short belt conveyor, is suspended from levers terminating in the dial scale. Belt provides a live-bottom for weigh hopper and facilitates discharge.

A differential scale, unit automatically and continuously delivers a selected amount of material, weight of which is difference between a fully loaded and partially loaded scale. Key to the system are electronic controls that govern the differential weighing process and conversion of weight from analog to digital indication.

To start a weighing cycle, operator feeds material into weigh hopper by pushing a start button located on a remote panel board. (Assume that 1,000 lb. batches are to be discharged and pre-set tare load is 100 lb.). As hopper is loaded, dial-scale pointer moves until it indicates 1,100 lb. Feeding then stops. After dial pointer steadies itself momentarily, the belt goes into operation, discharging material as it moves. As product drops from weigher, scale pointer returns to the 100 lb. tare. Belt stops at this point and required load has been discharged.

The totalizer, which may be located next to dial scale or remotely, indicates this weight. Cycle then automatically repeats itself. Total amount of material discharged is shown after each weighing. And a dial-head printer is available to give a permanent record of individual weights.

Scale's control panel contains totalizer, operating pushbuttons, and multicolored pilot lights that indicate progress of cycle. It also contains jog buttons for operating the system manually. In this case, a residue of material can be accumulated on the belt. Discharge jog button enables operator to empty the system completely.

Conveyor has a scraper on the under side to keep material from building up on the belt, a regulator device that adjusts depth of material, and adjustments for belt tension and take-up.—*Richardson Scale Co., Van Houten Ave., Clifton, N. J.*

Circle 139C on Reader Service Card

Tinless Solder Increases Can Side-Seam Strength

High bond strength plus excellent adhesion to plain metal and most interior lacquer coatings are advantages cited for a new tinless solder. This thermoplastic organic material is now being used for sealing frozen concentrate and tomato paste cans.

Bonding agent is applied to can seams at 345 F. Then cooling to 275

HERE IT IS! CRCO's* NEW
*SAY "SEE-AR-CO"
BLANCHER

BUILT TO BEAT CONTAMINATION

SANITARY
Hinged doors on both sides, wide clearance between shell and cylinder make cleaning easy.

NO CONTAMINATION
Vented only at feed and discharge openings to prevent the drafts, cool spots where bacteria grow.

AND LOOK AT THIS!

★ All corners and edges are rounded to eliminate bacteria breeding places.
★ Disc and rod construction of inner drum.
★ Flushable heating pipes.
★ Cylinder accessible from feed and discharge openings.
★ All fabricated construction — no castings.

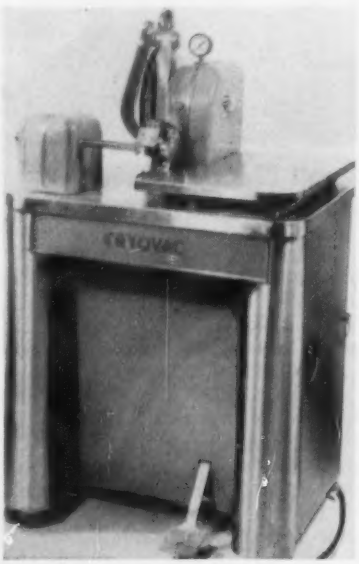
The Feature Finders are right! CRCO's new Blancher doesn't give bacteria the time, temperature or place to grow. Write for complete data.

THE BEST OF Everything
CHISHOLM-RYDER CO. INC.
Niagara Falls, New York
ON THE FOOD PROCESSOR

Equipment & Supplies

F. solidifies the compound into an air-tight seal. Normal food processing temperatures (240 F. for 30 min.) do not affect the bond, and elimination of solder stripe permits overall enamel labeling.—*Dewey & Almy Chemical Co., 2 Whittemore Ave., Cambridge 40, Mass.*

Circle 139D on Reader Service Card



Vacuum Packaging Sped With Versatile Machine

This redesigned vacuum-packager incorporates improvements that offer fast and simple operation with foods such as meats, cheese, and poultry.

Known as Model CW-C, unit is semi-automatic and may be operated from a standing or sitting position. Machine is housed in a console-type cabinet made of a high-impact, low-pressure, moldable plastic (Boltaron). Latter is available in various colors and finishing, thus need for painting is eliminated.

Design improvements include a simplified nozzle-twisting mechanism and vacuum control. A cut-off knife with safety guard trims back ends automatically. Standard equipment provides an air-powered horizontal clip applier that makes uniformly tight closures.

Machine employs interchangeable heads. Further, operator may now slide (rather than lift) the product onto vacuum nozzles—a faster and easier operation that increases efficiency. Maker's Saran bags (Cryovac) are used with the machine.

In packaging, product is slipped into bag and bag neck is placed over

MORE PROOF it pays to package in film made of BAKELITE Polyethylene

Packaging by **Central States Paper and Bag Company, Inc.**, St. Louis, Mo.

"Quality protection—quality appearance—savings, too"

That is how J. W. Allen & Co., Chicago, Ill., has benefited by switching to packaging in film made of BAKELITE Brand Polyethylene. Poppy, caraway, sesame seeds, decorettes, and other products for bakers and confectioners were sold previously in large cartons (which were unwieldy and left the product unprotected after initial opening).

"These bags help the user and have effected a saving in costs for us," states Frank W. Allen, president. "Quality is vital in our field. Polyethylene bags keep the products dry and clean; any infestation could be spotted immediately. They are tough, neutral and tasteless, and re-seal tightly to maintain product sanitation for the user. And they promote increased sales by showing off the product and letting customers see what they are getting all the way through."

There's practically no end to the kinds of food products that benefit by the varied and unique advantages of packaging in film made of BAKELITE Polyethylene. Why not explore the possibilities for you? See your packaging supplier.

SPECIFY FILM MADE OF

BAKELITE
BRAND
Polyethylene Plastic

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.
The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

NEW BRISTOL 500EW Air-Operated Controller offers proportional band to 400% and reset-plus-derivative control.

New Bristol 500W Air-Operated Controller offers proportional band-width up to 400%

The new 500W Controller, latest addition to Bristol's 500 Series of Air-Operated Controllers, offers better control of difficult processes than ever before. The 500W features:

1. **Wider proportional band** allows control of difficult processes without cycling or instability. Choice of two band-width ranges from 1% – 200% or 2% – 400% of chart width, adjustable by user. Choice can be made by the user – no extra parts, no special tools, no calibration required.

2. **Increased stability,** without loss of sensitivity, for smoother control. New internal stabilizing elements insure freedom from short-period oscillations.

3. **Wider reset response** range to eliminate offset or droop errors in control. Standard reset rate of 0.1 to 10 repeats per minute or fast reset rate of 1 to 300 repeats per minute are available.

4. **Increased derivative range,** for better response to changing variables. Derivative time adjustable from 0.2 to 20 minutes. Bristol's exclusive zero derivative setting facilitates adjustment of controller to process.

5. **Fixed links and levers** give built-in calibration for greater accuracy, no misadjustment, low maintenance.

You'll find Bristol's widened line of Series 500 Air-Operated Controllers more than ever adaptable to your control problem – whether for controlling pressures, liquid-level, flow, temperature, motion, speed, pH, electrical values, or other variables. Why not get all the facts on these instruments? Write The Bristol Company, 115 Bristol Road, Waterbury 20, Conn. 5.35

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BRISTOL

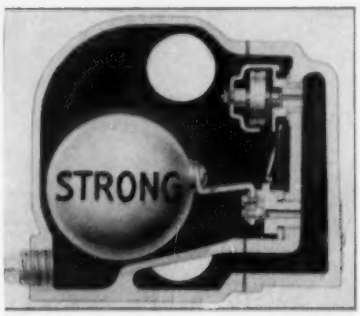
POINTS THE WAY IN HUMAN-ENGINEERED INSTRUMENTATION

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

unit's vacuum nozzle. Packager exhausts air, twists the neck, seals, and trims away excess. Process is completed by briefly dipping entire product in hot water. This shrinks the film about 30%, causing bag to cling to product contours like a "second skin."

Unit is about 33 in. wide, 27 in. deep, and 59 in. high. It is shipped fully assembled, weight approximately 400 lb. Machine operates on 115v, a.c., and requires 50 psi. air pressure. —*Dewey & Almy Co., Cambridge, Mass.*

Circle 140A on Reader Service Card



Faster Heating Permitted With New Trap Design

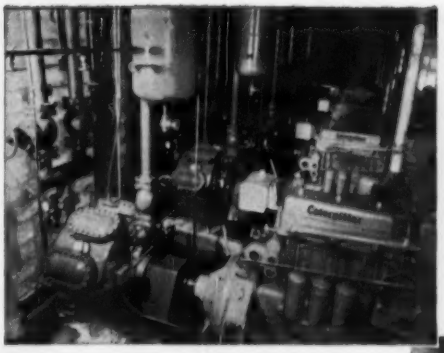
Rapid air and condensate removal in low-pressure steam systems is an advantage reported for a new line of traps called Float & Thermostatic.

Designed for fast and efficient heating at pressures up to 15 psi., their operation prevents trap and connecting piping from becoming air bound. Capacities range from 70-5,750 pounds of water per hour, depending on pressure differential and size of connecting piping. Latter includes five standard sizes from ¾ to 2 in.

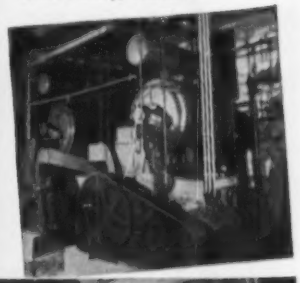
Unit's dual-operating functions are performed by an expanding thermal element and a ball-type float mechanism. At low temperatures, thermal element contracts to permit unrestricted removal of air to the outlet side. As temperature increases, the element expands and closes the outlet to seal trap against escape of steam.

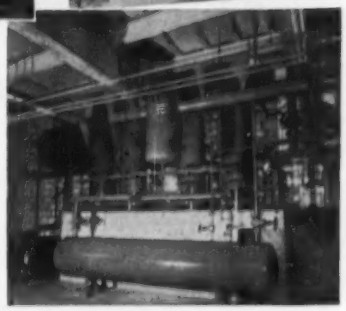
Float mechanism is designed to keep the outlet valve closed until condensate level reaches a predetermined height. As this level continues to rise, the ball floats upward, outlet valve opens, and condensate flows from trap.

Units are termed simple in construction and easily maintained. All pipe connections are located on the body, with inlets and outlets on each side clearly marked. For accessibility, all



Dawal Farms, Inc.
Dade County, Florida





Q. What is the best way to protect the "garden crispness" of your fresh picked vegetable?

A. use *Vilter* REFRIGERATION— *costs less to own**

Quality vegetables carefully picked at the height of perfection . . . promptly cooled . . . Vilter cooled the scientific, modern way to preserve their nutritional goodness and protect their crisp garden freshness—that's the Dawal Farm way of marketing its produce . . . a profitable way, too.

With over 70,000 acres of coral rock land under cultivation, Dawal Farms, Inc., of Dade County, Florida, needed a pre-cooling plant in the Redlands district to properly prepare corn for shipment to northern markets. Such a plant, with all Vilter refrigeration equipment, was built at Princeton, Florida.

Here picked corn is processed at the rate of 1000 fifty-pound crates per hour . . . cooling the corn from 85° to 38°. This is how it is done: Crated sweet corn moves through a sluicer tank equipped with Vilter Raceway Coils and Vertical Agitators . . . the corn being cooled by circulating 32° water and water spray. From here the crates move into a cold storage room maintained at 45° by a Vilter Air Unit. Adjoining this room is the ice storage bin where Ice Briquettes are made by two 30-ton Vilter Pakicers.

Five Vilter VMC compressors supply the refrigeration to the sluicer tank cooling equipment, the Pakicers, product storage room and the ice bin. Four Vilter condensers and one 3000-pound Vilter receiver complete the installation.

The Dawal Farm people are proud of this pre-cooling plant . . . and are completelely satisfied with the fine service provided by the Vilter equipment. Wherever you have an application in the food field, Vilter refrigeration can handle it. Meat packers, dairy operators, frozen food processors and other users of refrigeration in the food field have found it profitable to rely on Vilter. So will you!

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter.

QUALITY CRAFTSMANSHIP that lasts . . .
ENGINEERING DESIGN that guarantees performance

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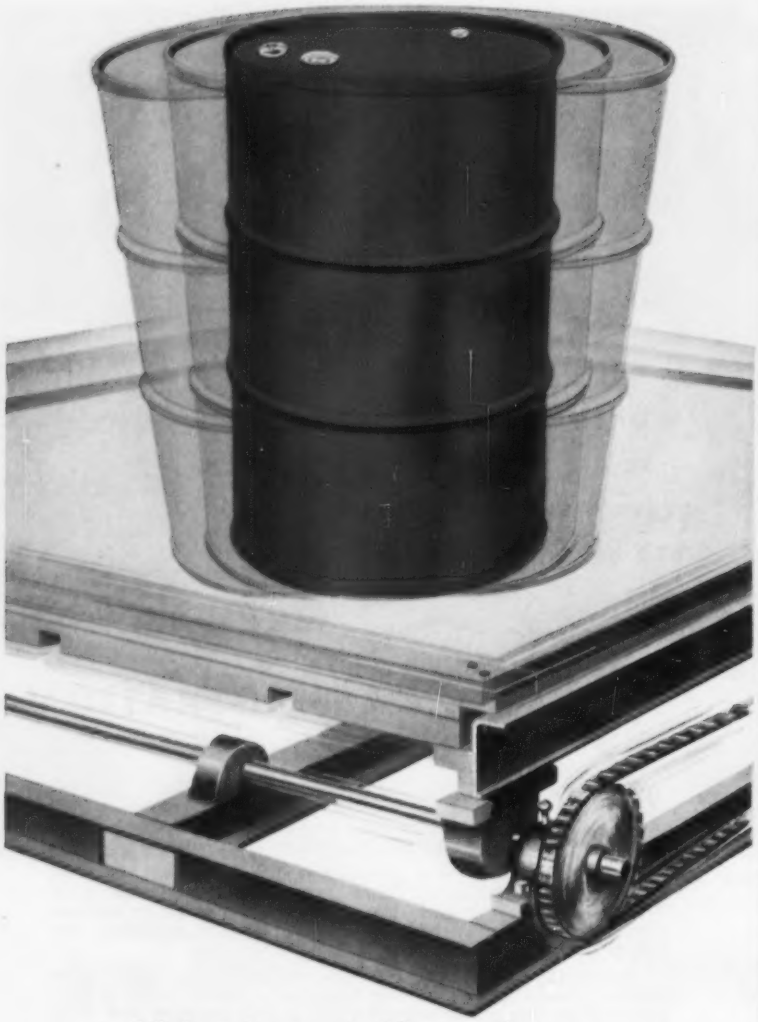
Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water and Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice and Polarflake Ice Machines



We beat the drum
to cut your shipping costs

Giving a drum "the shakes" to duplicate the destructive forces of freight car and motor truck vibration, is just one of the many research projects conducted by the Steel Shipping Container Institute at Battelle Memorial Institute. Industry researchers are constantly exploring new processes and techniques to improve container design and construction for special products. This work includes gages and analyses of steel, new contamination-inhibiting treatments and improved linings and exterior coatings.

Since 1947 the Steel Shipping Container Institute has also been working in close cooperation with industry committees of leading container users to develop new methods of reducing packaging costs and to achieve the best possible container protection for a wide range of diverse products. For information on how it will pay you to give your product the benefit of shipping in New Steel Containers, write us today!

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Equipment & Supplies

internal working parts are attached to the cover, which may be removed without disturbing pipe connections.

Body and cover are of gray iron. Valve and seat, and spring fulcrum are stainless steel. Parts in valve lever and bracket assembly are of brass, while float is copper hided. Thermostatic element consists of thermostat. integral seal, gasket, lockwasher, cage, and nut, assembled in a single unit, factory set and sealed.—*Strong Carlisle & Hammond Co.*, 1392 W. 3rd St., *Cleveland* 13.

Circle 143A on Reader Service Card

Safe Work Area Provided By New Laboratory Hood

To protect laboratory personnel and property, this chemical fume hood efficiently evacuates obnoxious or poisonous gases, and dust-laden air.

Called Metal-Aire, unit has double-well construction. Exterior of the hood chamber is heavy-gage reinforced steel with baked-on enamel to match the supporting unit. Interior is made of treated Transite panels, tightly fitted and cemented so that no metal is exposed. Supporting unit has a half-depth enamel-steel removable shelf, and a removable back for easy access to pipe space.

Hoods are available in a variety of sizes and models.—*Metalab Equipment Corp., Hicksville, L. I., N. Y.*

Circle 144A on Reader Service Card

High-Speed R.R. Car Icer Is Automatic, Efficient

A new dock-type car icer, designed for fast, efficient icing of railroad refrigerator cars, is an automatic unit that can easily be operated by one man.

Known as Model "55," its use reportedly minimizes train delays for on-time arrival of perishable produce.

Anything Less is an Old-Fashioned Truck!

If you don't get all the modern advantages new Chevrolet trucks offer, you stand to lose money on the job today and at trade-in time tomorrow

Look at it this way. The more modern the truck, the more quickly and efficiently it does the job. And if it's loaded with ultra-modern features, you're bound to be farther ahead at trade-in time. Now look at the way Chevrolet fills the bill. Even so-called new trucks are old fashioned without all these Task-Force advantages!

Shortest stroke V8's* of any leading truck—the most modern truck engines money can buy! Their compact, short-stroke design means longer life, because of less friction and wear. Chevrolet's extra-rugged and dependable high-compression valve-in-head Sixes are ultra economical to keep humming. They squeeze more power out of a tankful of gas!

The latest in cab comfort and safety—High-Level ventilation, panoramic windshield, concealed Safety Steps—features that boost driver efficiency!

Most modern chassis features—new suspension, more rigid ladder-type frames, Power Brakes standard equipment on 2-ton jobs!

Work Styling—Here's heavy-duty styling that's matched to the job; modern styling that calls attention to your business! Your Chevrolet dealer has complete details. See him soon. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

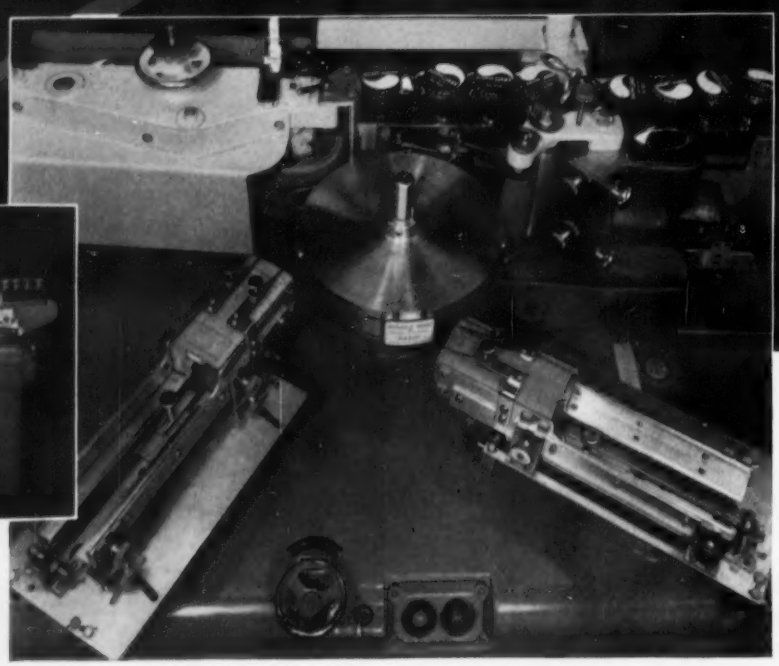
**V8 standard in L.C.F. models, an extra-cost option in all others except Forward-Control models.*

NEW CHEVROLET CHEVROLET *Task-Force* TRUCKS

Lightning Labelers

DESIGNED FOR TOP SPEED APPLICATION

on round containers



Speeds up to 300 per minute

Write for Bulletin 129

Operating on an all mechanical, constant motion principle, these machines speed the labeling operation through their simplification of design and their own uniquely direct method of application.

A helical intake feeds and spaces the containers which travel straight through on a platform chain conveyor.

From a vertical gluing roll a uniform film of adhesive is transferred to segments of a glue cylinder. These glue faced segments then "pick off" labels from the reciprocating magazines. The glued labels are directly transferred to the containers by means of a rotating transfer cylinder. The containers then roll between pressure belts and a stationary pad which properly "wipes" down each label.

Straight through without stop or pause — that's the answer to the Lightning Labeler's (1 and 2) smooth, uninterrupted delivery of containers with accurately registered, smoothly adhered labels. If your container is round, the Lightning's a machine you should look at, by all means!

PNEUMATIC SCALE CORP., LTD., 91 Newport Ave., Quincy 71, Mass. *Also: New York; Chicago; Dallas; San Francisco; Los Angeles; Seattle.*

PNEUMATIC ***Packaging and Bottling Equipment***

Also, loss through ice shrinkage is reduced to further cut operating costs.

Unit delivers three sizes of ice—chunk, coarse, or crushed. It receives 300- or 400-lb cakes "on the flat" from a dock conveyor, crushes them and delivers ice in desired sizes to car bunkers. Up to 40 cakes of ice per minute may be processed, and a car can be iced in seconds.

Track-mounted machine is self-propelled and can be easily adapted to existing railway docks. It consists of a pick-up conveyor, crusher unit, reversible cross conveyor, and two pivoted discharge chutes which deliver to bunkers. Units are available in two designs, single-end and double-end types. Latter has dual pick-up conveyors and crushers.

One man controls all operations from an elevated platform providing complete visibility. Hydraulic and electrical controls are grouped together in the control station for ease of operation.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 144B on Reader Service Card

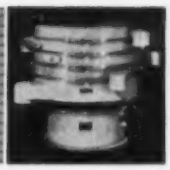
High-Speed Portable Unit Ups Coding Flexibility

This portable automatic coder imprints dates and other changeable legends on bottoms of jars, bottles, and cans at speeds up to 600 per min.

Machine's portability permits freedom of application since installation on a production line does not require altering an existing setup. Further, unit can be switched from one line to another and attached without breaking into the line.

Known as "Model TB" Markocoder, unit employs readily interchangeable rubber-type and fast-drying liquid flexographic inks to produce sharp impressions and prevent smudging. It functions with a smooth rotary

SCREENING NEWS

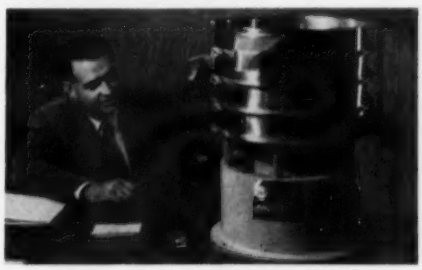


Dolly Mounted SWECO Screens Yeast For Lone Star Brewing Company

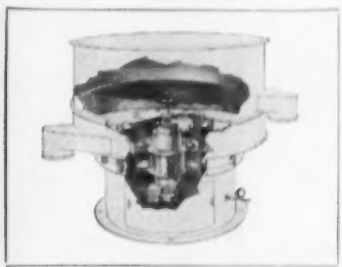
The Lone Star Brewing Company of San Antonio, Texas, has improved its method of yeast screening with a SWECO dolly-mounted Gyratory Screen Separator. The stainless steel 18" dia. SWECO screens coagulated protein particles from yeast at the rate of 5.7 gallons per minute through 48 mesh. As the spring mounts on the SWECO damp out all imparted vibration, the unit is mounted on a dolly and becomes portable for easy transfer under yeast tanks. A special rack guides the intake hose and a discharge spout provides ready alignment with receiving tanks.

44% of the Largest U.S. Firms Use SWECO Separators

According to a recent customer survey, 55% of the nation's largest manufacturers use the products and/or engineering services of Southwestern Engineering Company. 44% are satisfied customers and users of SWECO Gyratory Screen Separators.



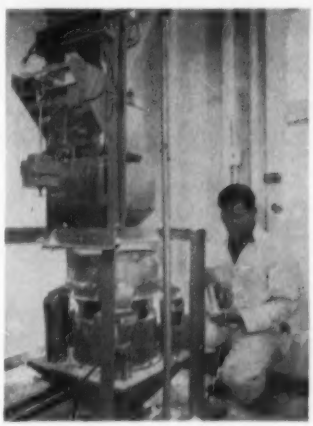
18" SWECO shown *in operation* on an office desk. Absence of imparted vibration makes portable dolly mounting practicable.



SWECO "3-D" SCREENING ACTION tumbles material in three directions at once... increases efficiency as much as 10 to 1.

Bulk Sugar at 9000 lbs./hr. For Ventura Coastal Lemon Co.

Ventura Coastal Lemon Company, one of California's largest processors of concentrated frozen lemonade, called in SWECO on the following screening problem: Material: bulk sugar. Desired throughput 9000 lbs./hr. Screening unit to occupy minimum space and transmit minimum vibration to surrounding equipment. Solution: One 18 inch dia. SWECO Vibrating Screen Separator, Model H-1D-5 (SWECO's smallest) as shown. Result: Satisfactory operation with specified throughput of 9000 lbs./hr. through 10 and 16-mesh screens.



Free screening analysis and recommendations . . .

Your nearby SWECO District Engineer is available to help you with special screening problems. His know-how covers 241 different materials . . . wet or dry, coarse or fine, heavy or light.

SEND FOR BULLETIN No. 59-33

Detailed information on high-efficiency, low-cost applications of SWECO Screen Separators.

SWECO

Southwestern Engineering Company
4800 Santa Fe Ave., Los Angeles 58, Calif. LOgan 8-6262

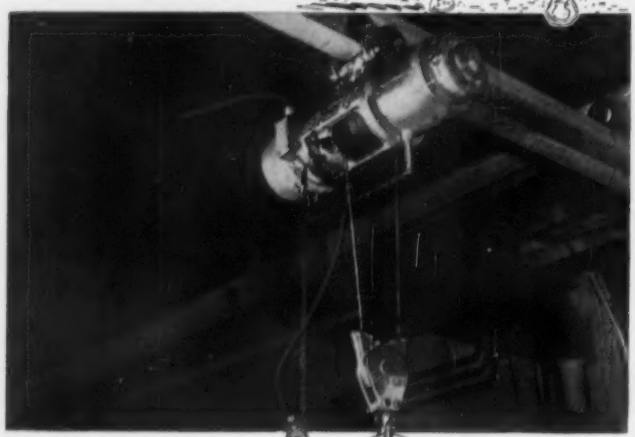
Engineers and Constructors...Manufacturers

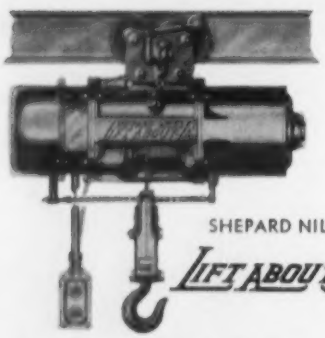
SHEPARD NILES

LIFTABOUT-JR.

PACE SETTER

on your production line





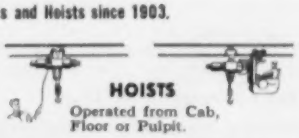
MEN AND MACHINES both produce faster when a Liftabout-Jr. carries the load! Manual lifting and lugging are banished . . . the worker puts the load right where it's wanted with ease. Ideal for "spot" handling or for speeding raw materials and products along your production line.

Shepard Niles Liftabout-Jr. is built to withstand years of use and abuse . . . it's the toughest medium-service hoist money can buy. Available with either rope or push button operation . . .parallel or cross-mounted with bolt, hook or trolley suspension in 250, 500, 1000 or 2000 lb. capacities.

Send for Hoist Bulletin today . . . and request a Shepard Niles representative to call. He'll give you the facts on the complete Liftabout-Jr. line . . . help you select the hoist with the right capacity and controls for your lifting job.

America's Most Complete Line of Cranes and Hoists since 1903.

CRANES
Overhead: Top Running, Inner Running, Under Running, Floor or Cab Operated.



HOISTS
Operated from Cab, Floor or Pulpit.

SHEPARD NILES
CRANE AND HOIST CORPORATION

1269 Schuyler Ave., Montour Falls, N. Y.

Equipment & Supplies

action that provides for control of containers without interrupting normal flow. Container surfaces may be flat or concave, flush, or recessed.

Coder occupies a floor space of 24 x 30 in., and may be quickly adjusted to accomodate containers of different size and style.—*Adolph Gottscho, Inc., Hillside 5, N. J.*

Circle 147A on Reader Service Card

"Weld Bead" Is Eliminated In New Forming Method

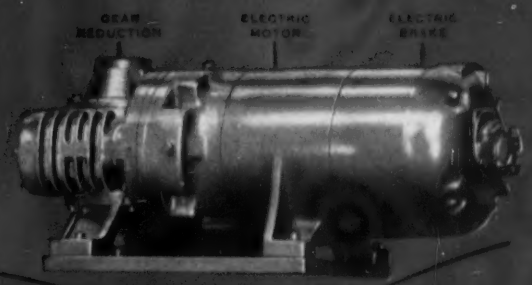
A patented welding process, which eliminates the weld bead on the inside diameter of tubing, offers better physical properties, appearance, and corrosion resistance to stainless-steel and high-alloy tubing and pipe.

The method (Trentweld) uses the inert-gas shielded-arc process. Heat is generated by an arc struck between a non-consummable tungsten electrode and the work. This arc occurs entirely in a shielded atmosphere of inert gas, such as helium or argon, while arc length is automatically maintained.

No additional metal is required as the weld is a complete fusion of butted edges of the strip. Result is a weld of same composition as the parent metal, and free from inclusions or oxides.

Therefore, new tubing and pipe are said to have superior fabrication properties for production of tube assemblies, heat exchangers, condensers, and boilers. Also, a smooth interior offers a better surface for rolling in of tubes in tube sheets. Corrosion resistance is improved because absence of valleys or grooves (simulating an undercut condition) leaves no place for solids to deposit or corrodants to become entrapped. Thus, failure due to pit-type corrosion is curbed.—*Trent Tube Co., East Troy, Wis.*

Circle 148A on Reader Service Card

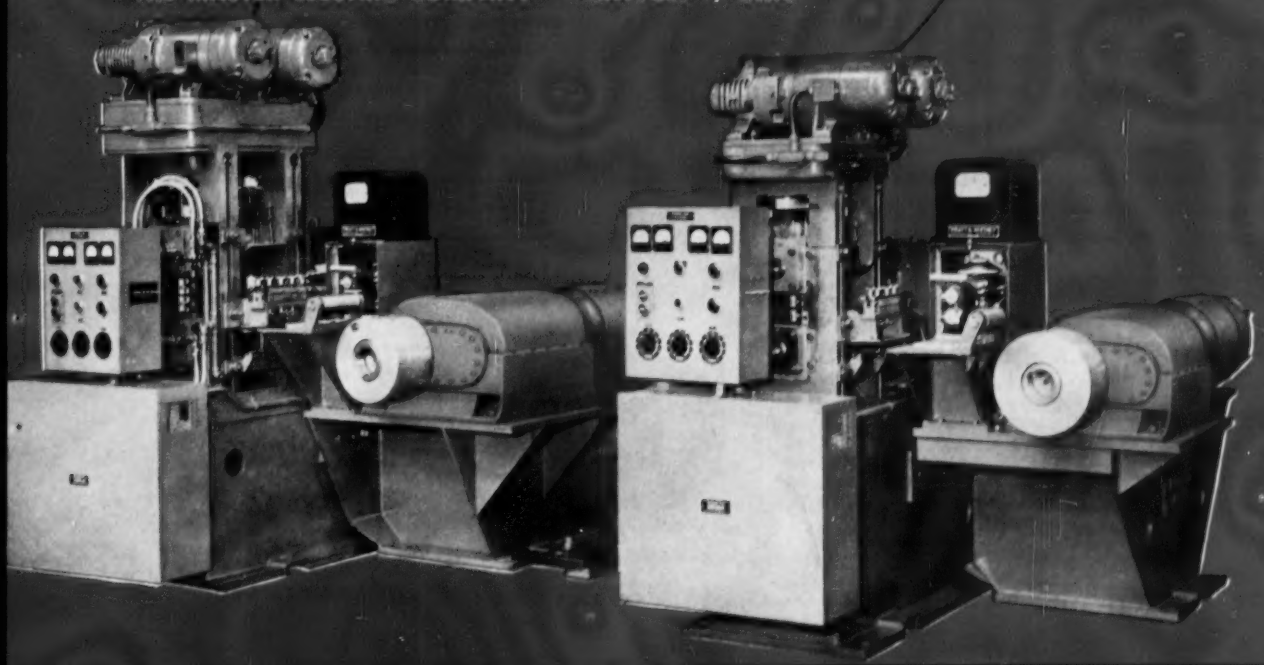


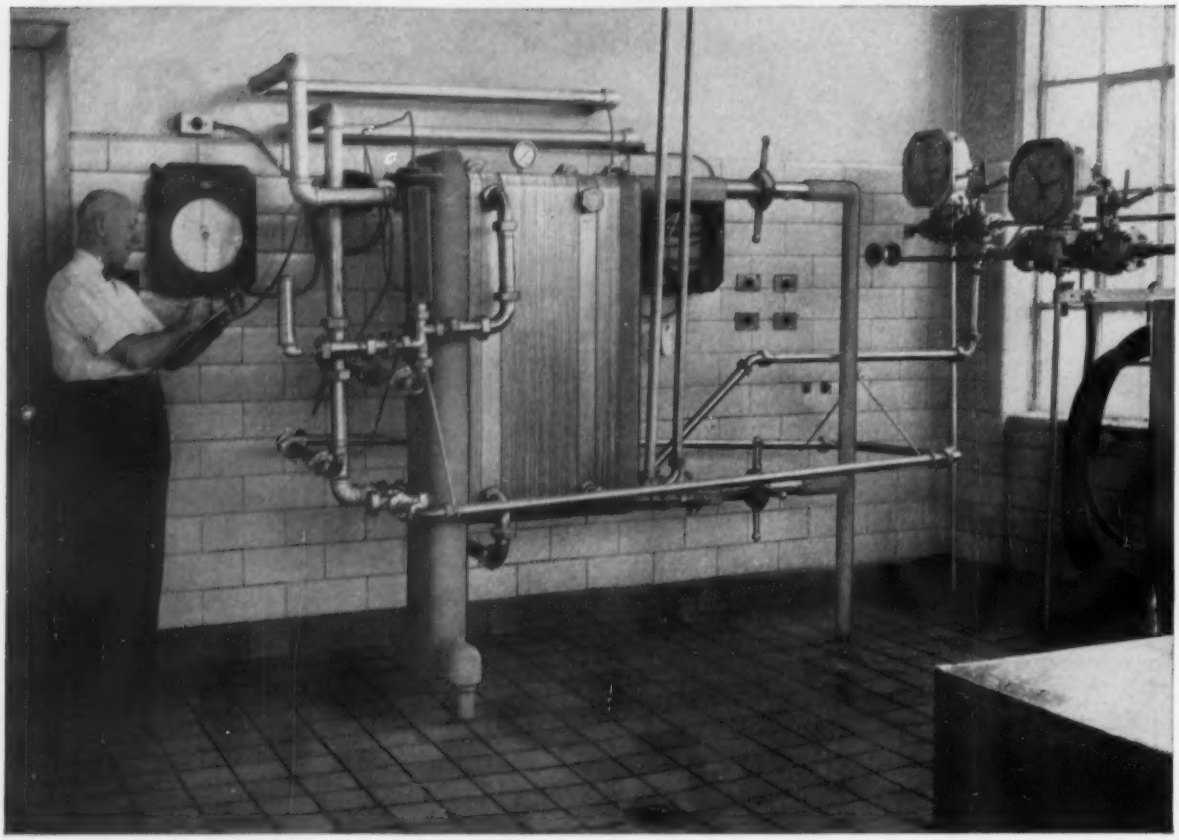
See how easily the standard electric motor, standard gear reduction, standard electric brake combine into a drive that gives the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features . . . all in one compact unit. Nowhere else will you find power units that are so flexible, so easily adaptable, and in such a wide range of types and ratings.

Master power drives are available in thousands and thousands of ratings (⅛ to 400 HP) . . . in open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 430 to 1 ratio . . . with electric brakes . . . with fluid-drive . . . with mechanical or electronic variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best power drive for you.

standard units easily combine into special purpose drives

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO





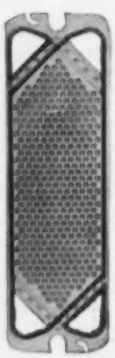
He's keeping tabs...but on what product...what process?

Here You Can't Tell what's going on inside this Cherry-Burrell "Superplate" heat exchanger. From where you sit, the *product* and the *process* could be almost anything.

That's just the point. "Superplate" handles so many products so efficiently that this operator could be taking a reading on *any* of those liquids listed at the right.

Versatile in handling products? Yes. And "Superplate" is just as versatile in processing operations, too. You can use it as a heater, as a cooler, a regenerator or Shortime pasteurizer.

And no matter *how* you use "Superplate" . . . or on *what* . . . it's bound to speed processing operations, lower water, refrigeration and steam costs and help you produce a better product . . . for less money, and in less space.



Here you can see why you get better heat transfer

Exclusive Electropolished Plates of 304 or 316 stainless steel give greater resistance to water deposits; eliminate sticking of solids.

3-D Turbulence set up by patented knobbed design accelerates heat transfer with low pressure drop.

Nonclogging Flow Space between plates, full length.

Largest Port Areas of any plate for low product and heating or cooling media pressures.

Here you have some of the products "Superplate" handles

Amino Acids	Condensed Milk	Ice Cream Mix	Soy Bean Concentrates
Apple Juice	Cottonseed Oil	Liquid Sugar	Vegetable Juices
Bottled Water	Cream	Milk Products	Vinegar
Baby Food	Edible Oil	Salad Oil	Whey
Chocolate Liquor	Eggs	Soda Syrup	Wine
Citrus Juices	Eggnog	Soups	Wort
Clam Juice	Fruit Juices	Sour Cream	
Coffee Extract	Grape Juice		

ASK THIS MAN

—your Cherry-Burrell Representative—about our complete "Superplate" service. Includes design, installation and supervised operation of the versatile plate-type heat exchanger that's best for your process, your product, your plant.

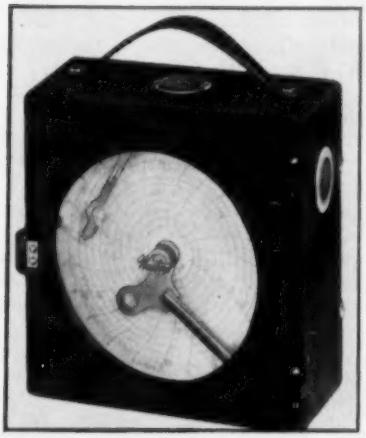
CHERRY-BURRELL
CORPORATION

427 W. Randolph Street, Chicago 6, Illinois

Dairy - Food - Farm - Beverage - Brewing - Chemical - Equipment and Supplies

SALES AND SERVICE IN 58 CITIES—U. S. AND CANADA

Equipment & Supplies



Temperature Recorder Changes Range Quickly

This bimetal-actuated miniature recorder, for use in cold-storage rooms and transportation of perishables, is redesigned for easy, rapid range changing and accurate operation in any position.

High-sensitivity unit (Model 8465) is a self-contained instrument, unaffected by atmospheric pressures and severe service. The pen operates directly off the sensing element without multiplying levers. Case is made of die-cast aluminum for crush-resistance, and has no protruding parts. Unit has a wide range of operating temperatures, −40 to 140 F., in 50- and 100-deg. included spans.

Range changes can be made simply by inserting new chart and, using a standard thermometer as reference, adjusting range-changing screw with ordinary screwdriver.—*Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.*

Circle 151A on Reader Service Card

Control Panel Operates Zeolite Water Softener

An automatic control system for dual-type zeolite softeners is offered as part of a pre-engineered unit including flow meter, automatic multiport valve, zeolite softeners, brine measuring tanks, and connecting lines.

Key to this system is the electrical control panel containing a series of relays and a multi-cam timer which initiate periodic, timed regeneration of softeners. Incoming raw water is measured by an inlet water-meter register. When a predetermined volume passes through meter, a contact automatically closes to begin regeneration. One relay is immediately locked

Precision Weigh Filling Machine for Economical Food Packaging

This machine is ideal for filling any free-flowing material into bags, boxes or cartons. Precision fill is assured by electronic controls connected with an Exact Weight precision industrial scale.

Model 1001-FM-2-30, illustrated, is a flexible design capable of handling various quantities from a few pounds up to 25 pounds. Vibratory feeder with adjustable fast to trickle feed insures greatest accuracy on every package. Visible indication permits accurate check by operator to maintain constant weights.

Other Exact Weight weighing machines are available with either automatic or semi-automatic controls. They are widely used in the food industry for packaging, bagging, batching, compounding and weigh feeding into processing machines. Capacities from a few grams up to 150 pounds.

Write for complete information on Exact Weight Weigh Feeders.

Sales and Service Coast to Coast

Exact Weight Scales

Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

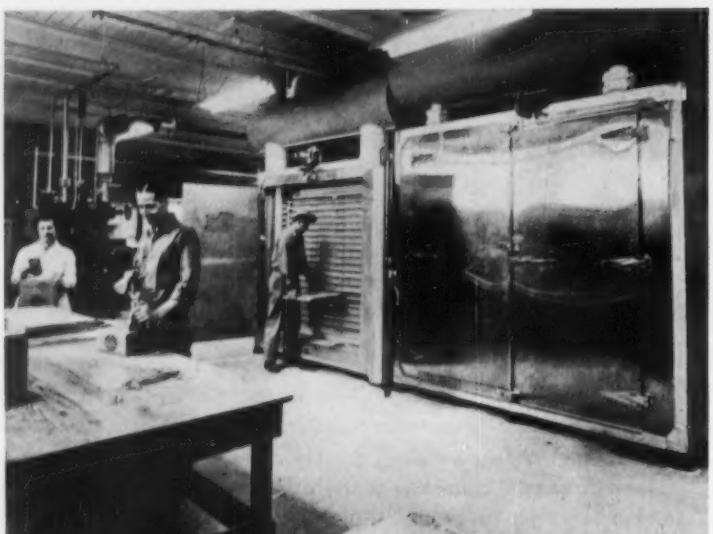
910 W. Fifth Avenue, Columbus 8, Ohio
In Canada: P. O. Box 179, Station S, Toronto 18, Ont.

GET YOUR SHARE OF THE *Frozen Food* PROFITS

Freeze with **AMERIO**

DOUBLE CONTACT **Pressure Plate Freezers**

(U. S. Pat. No. 2,608,069) (Canadian Patent No. 494,746)



"AMERIO FREEZERS" in the plant of Commodore Foods

Leading Frozen Food Processors Prefer

"Amerios" for the fastest, finest, most economical freezing of Consumer and Institutional Packages.
Be it Meat, Fish, Fruits, Vegetables, Poultry or Pre-cooked Foods, "Amerios" do a better job. Simple, automatic and fool-proof in action with always uniform packages.

Write or phone for full details

Designed For Ammonia, Brine or Freon Refrigerant

Amerio
Contact Plate Freezers Inc.
Union City, N.J.
"It's the Contacts that Count"

Send For Illustrated Booklet

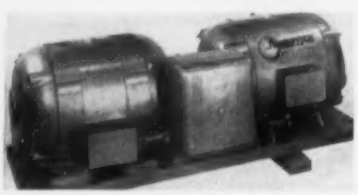
Equipment & Supplies

in while another is locked out, so that only one softener is regenerated at a time.

This relay, in turn, starts the timer motor which rotates a cam shaft through a series of switches, each of which positions the multi-port valve for successive backwash, inject-displace, rinse, and service operation. Rotation of valve port for these four positions is accomplished by a lift-turn arrangement consisting of a spiral-grooved, guided shaft and attached diaphragm assembly. Valve remains in one specific position only when water pressure on either side of diaphragm is equalized. A solenoid bleed valve atop the multi-port valve, energized by current from switch stations, provides the pressure variation to turn the valve rotor.

Once regeneration is complete and valve returns to service position, inlet meter register is also reset. Simultaneously, timer reset switch is tripped releasing lockout and permitting a new cycle on another softener to begin. Manual controls can be substituted for both inlet meter register and automatic multi-port valve.—*Graver Water Conditioning Co., 216 W. 14th St., New York City 11.*

Circle 1518 on Reader Service Card



These Sonic Generators Have Higher Kw. Range

Alternators capable of supplying economical power for energizing multiple arrays of ultrasonic sound-generating transducers, are now available in sizes from 2 to 150 kw.

As a result, laboratory ultrasonic experimentation can now be extended

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

short

STANDARD-KNAPP GLUER & SEALER

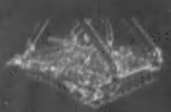
Installation above illustrates the economy obtained in *space* and *labor* by using Standard-Knapp Short Hand Fed Gluers and Sealers. Compact 11½' length — ⅓ shorter than usual. Two units in this installation require one operator and handle different case sizes.

DOES A BIG JOB IN SMALL SPACE

Standard-Knapp's Short Model 429 Case Sealer is designed to get a lot of work done in a minimum of space. This compact unit, which both glues and seals manually fed cases, is only 11½' long. Yet it handles a wide range of case sizes and will glue and seal top or bottom flaps or both at speeds up to seven cases per minute. Higher speeds are possible if desired.

Featuring close-coupled integration of gluer and compression units, the 429 Short is built to the same high standards for which Standard-Knapp equipment is famous. You can count on cases that are tightly, squarely and uniformly sealed — with printed matter unobscured. We will be happy to give you complete details.

Please write Dept. F, Standard-Knapp, Division of Emhart Mfg. Co., Portland, Conn., for descriptive material.



PALLETIZERS

PACKERS

GLUERS AND SEALERS

UNSCRAMBLERS

LABELERS

PLUS other machines for a complete line or single unit.

so smooth...so quick...it's PACKAGING MAGIC

STANDARD-KNAPP

Division of Emhart Mfg. Co.

PORTLAND, CONNECTICUT

LATIN AMERICAN REPRESENTATIVES: American Steel Export Company, New York, N. Y.

PLASTIC

VALVES and PIPE FITTINGS

by

WALWORTH

These new corrosion-resistant valves and pipe fittings are molded of rigid polyvinyl chloride. They round out complete lines of Walworth Valves and Fittings of Steel, Stainless Steel, Bronze, Iron, and Special Alloys. A brochure explaining the complete Walworth PVC product story has been prepared for your information. Just send us your name and address. *Walworth Company, General Offices, 60 East 42nd Street, New York 17, New York.*

Equipment & Supplies

into full-scale plant production, which requires a considerable amount of high-frequency power per unit of treated work.

Typical proposed applications of ultrasonics include dispersion of oil-in-water emulsions, homogenization of milk, and altering of gelling properties of gelatin and pectins by depolymerization. Of greatest interest, however, is its possible use as a substitute for heat sterilization of heat-sensitive materials, because of its ability to destroy bacteria.

Transducers produce cavitation in biochemical systems, which often yields quicker and more uniform results than can be obtained by conventional processing. For example, a 230v., 20,000 cps. single-phase, 5 kw. generator, driven by a 15-hp., 3-phase, 60 cycle, 220-440v. a.c. squirrel-cage induction motor, energizes up to 10 submerged 400w. transducers.

Each transducer causes copious cavitation through a large field in the solution. Explosive force, caused by collapse and formation of millions of entrapped vapor bubbles at 20,000 times per sec., is about several hundred atmospheres pressure.—*Acoustica Associates, Inc., Glenwood Landing, L. I., N. Y.*

Circle 144A on Reader Service Card

New Chemicals

Stable Vitamin-A Product Is Mixture of Isomers

Liquid vitamin-A palmitate for aqueous dispersion-type products is now offered as a mixture of isomers—a form in which loss of potency is curbed.

Thus, formulation costs are cut, since there are smaller overages, while finished products have increased stability. New material is standardized at a potency of 1,000,000 U.S.P. units per gram.—*Chas. Pfizer & Co., 630 Flushing Ave., Brooklyn 6, N. Y.*

Circle 155A on Reader Service Card

Efficient Spray Minimizes Insecticide Residues

A recently developed spray, termed non-toxic and non-injurious to man and footstuffs, is offered to meet new insecticide residue tolerances.

Called Pyrenone 606 Spray (Niagara), material is an oil-free emulsifiable concentrate containing 60% piperonyl butoxide and 6% pyrethrum. When diluted with water, it can be safely used in all food handling

Codes product labels ...faster, cheaper, neater!

Offers processors and packers an easier, more economical way to date and identify their products.

Why not save money on your coding and imprinting? Why not do it with a Tickometer?

Hundreds of food and drug processors and packers now use the Tickometer exclusively to code-mark and/or date their product labels and cartons, to guard against imitations, to identify origins, machines, inspectors, factory lots and grades. The Tickometer does the job faster, cheaper—and unobtrusively.

Electrically operated, it counts, as it imprints, at speeds up to 1,000 per *minute*. Saves losses on unused labels that have pre-printed codes or identifications. Handles most kinds of cards, forms or paper items. And it's so accurate, banks use it to count currency!

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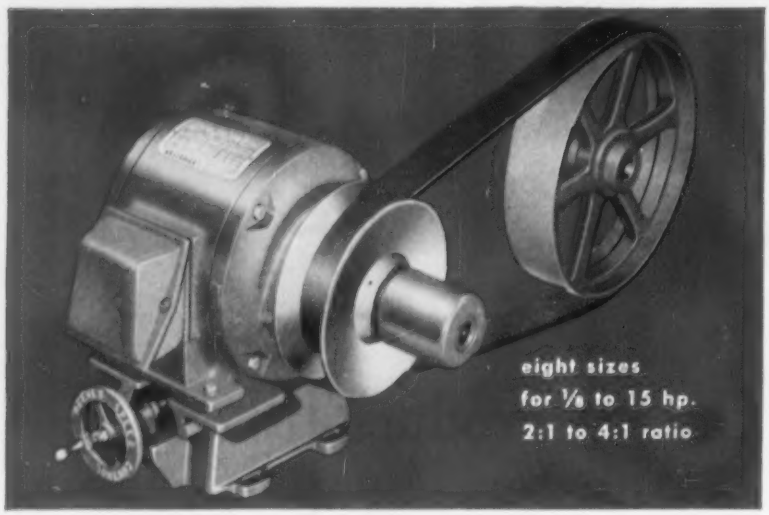
- RELIANCE Ac MOTOR
- DRIVEN PULLEY



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Vari-Speed Motor Pulley

This simple, compact REEVES unit provides an economical way to widen machine range, and an efficient method of adjusting work flow to changing conditions. Speed variations are effected smoothly and instantly—without stopping the machine! Unit also available without motor. For bulletin complete with rating charts and dimensions, write Department FE18-V545.

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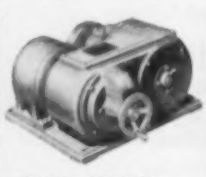
Transmission
Heavy duty—2:1 to 16:1 range—fractional hp. to 87 hp.



Vari-Speed Motodrive
Compact—2:1 to 6:1 range—sizes to 40 hp.—fractional with 10:1.

Flexi-Speed
Versatile, economical—8:1 range—½, ¾ and 1 hp.

The wide range of REEVES variable speed equipment is now supplemented by the line of Reliance drives. Now—more than ever—you can rely on your REEVES representative for the answer to any speed control problem.

REEVES PULLEY COMPANY, COLUMBUS, INDIANA
Division of **RELIANCE** *Electric and Engineering Co.*

Equipment & Supplies

areas. And being oil-free, it is particularly suited to food processing applications.

Accepted by USDA for use in packing and canning plants, it reportedly kills the following on contact: Fruit flies (drosophila), common flies, grain moths, gnats, roaches, silver fish, ants, mosquitoes, cheese skippers, and cheese mites.—*Niagara Chemical Div., Food Machinery & Chemical Corp Middleport, N. Y.*

Circle 155B on Reader Service Card

Briefs . . .

Pressure-Sensitive Tape of high adhesive and tensile strength has flexible crepe-paper backing resistant to heat, moisture, and stains.—*Behr-Manning Div., Norton Co., Troy, N. Y.* (156A)

Anhydrous Caffeine in dense, free-flowing, non-dusting form speeds handling, cuts production loss.—*Chas. Pfizer & Co., 630 Flushing Ave., Brooklyn 6, N. Y.* (156B)

Double-Deck Baker's Tray of hard vulcanized fiber with vinyl finish has increased capacity, cuts distribution costs.—*National Vulcanized Fibre Co., Wilmington 99, Del.* (156C)

Bag-Sealing Dispenser for pressure-sensitive tape makes produce prepackaging easier and faster.—*Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6,* (156D)

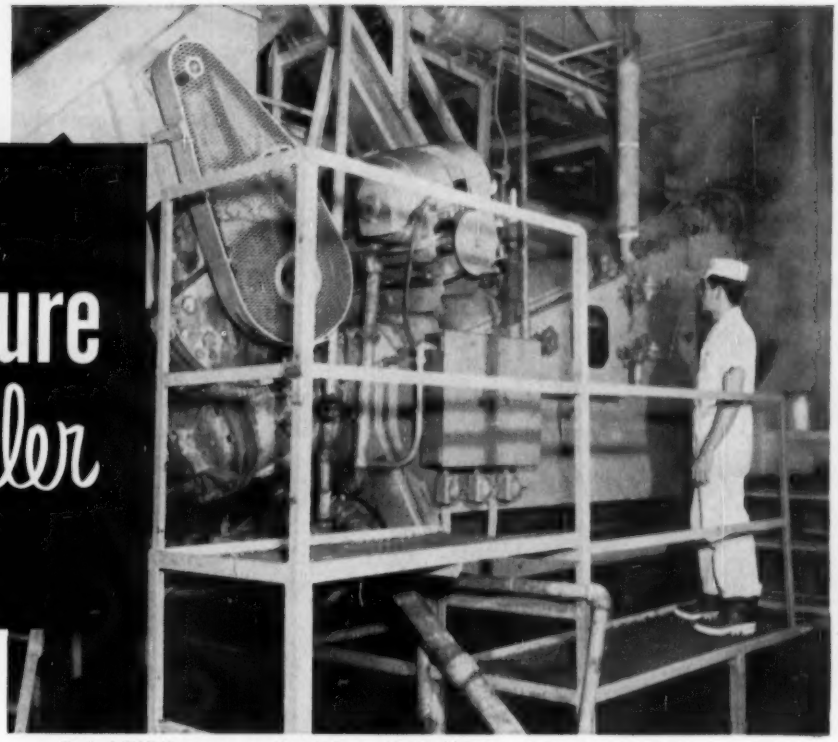
Flexible Urethane Foams, which are lightweight, water resistant and tough, have superior insulating properties.—*National Oil Products Co., River & First Sts., Harrison, N. J.* (156E)

All-Aluminum Conveyor with belt-plate top operates at up to 100 ft. per min., while sanitary construction eases cleaning.—*Mercury Industries, Inc., Conveyor Div., Hillsdale, N. J.* (156F)

Silicone Coating ups impact and abrasion resistance of glass containers, has no effect on foods below pH 6.5, fatty foods, and alcoholic beverages.—*Dow Corning Corp., Midland, Mich.* (156G)

Bimetallic Thermometer employs signal device, visible from 50 ft., that indicates deviation from preset temperature.—*W. C. Dillon & Co., 14,620 Keswick St., Van Nuys, Calif.* (156H)

Hi-Pressure *steam peeler*



Typical FMC Steamer preparing fruits and vegetables for *Gerber's Baby Foods* at their Oakland, California plant.

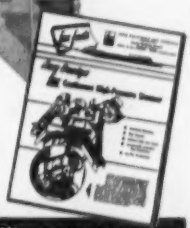
Makes Short Work of Tough Skins

It takes an FMC Continuous High Pressure Steamer, with automatic heat penetration control, to really loosen up the tough ones. Such vegetables as carrots, beets and potatoes (certain fruits, too) are quickly and uniformly exposed to steam pressures up to 120 P.S.I.G., which make the job of skin elimination easy, fast and thorough.

Built for various capacity requirements, this machine provides a yield of 10% or more over other methods of loosening skins. As an example of output, carrots are processed at 5 or more tons per hour under 25 to 30 seconds exposure to steam pressure. In addition, there's an extremely low waste factor, there's no damage to sub-surface nutritional layers, and continuous operation reduces the manpower normally required on non-automatic lines.

Want more information? Just mail the coupon today, or call your nearest FMC representative.

Improved model boasts many features, including adjustable condensate removal unit; rigid, large diameter turret shaft; hard, smooth plate-stock liners; 1¼" heavy duty pressure-resisting firebox side plates. Built to A.S.M.E. code for up to 120 lbs. pressure.



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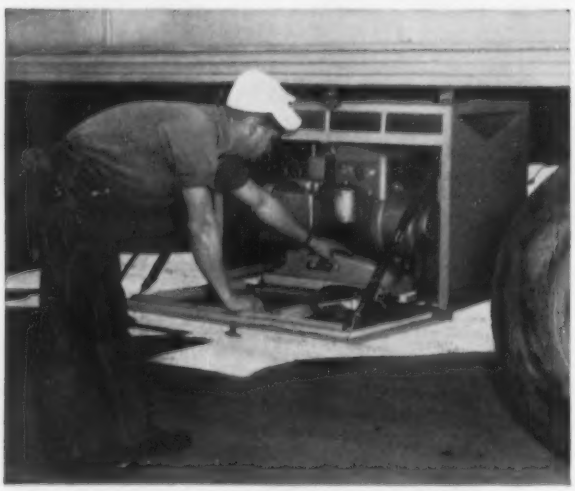


Exclusive design cuts operating and maintenance costs. The power unit mounts beneath the trailer...has flexible gas and electrical connections that permit the entire unit to be pulled out for easy accessibility.

Keep meat, poultry, dairy products—in fact, all perishables—fresh, whether on the road or at the dock, with the Coldmobile "CROSS-COUNTRY" (Model TR-15). The Coldmobile TR-15 saves money from the very beginning with a moderate initial cost. Its hermetically sealed design eliminates the need for belts, pulleys, jackshafts, clutches or unloading valves. The refrigeration unit mounts on the front wall of the trailer...doesn't waste cargo space.

Dependable Refrigeration When Parking. It's a simple matter for the driver to throw a switch connecting the refrigeration unit with the engine generator and press the starter button for sure, immediate starting. Or the generator can be switched off, permitting the refrigeration unit to operate on "plug-in" power.

Automatic Defrosting and Automatic Temperature Control. With the Coldmobile TR-15 the driver is assured of steady, efficient cooling at all times. There's no need to check the temperature, or take time to defrost the unit.

On-the-job performance proves the Coldmobile TR-15 provides new low-cost protection for interstate or cross-country hauling. For complete information, write—

UNARCO

COLDMOBILE DIVISION
UNION ASBESTOS & RUBBER COMPANY
2900 W. VERMONT STREET, BLUE ISLAND, ILLINOIS

20 Spots Fumigated From 1

—*Continued from page 65*

fumigation in a pre-determined amount (read on a pound-scale) is shot into a location. Valve is then closed, and the next is ready to be opened to carry on the cycle.

Air from a compressor supplies the propelling force, and a check valve preceding the air valve prevents fumigant from getting into the air line. Fumigant is air-jetted from the central panel through 18 copper pipes (¼ in.) to the 20 spots (two pipes splitting up to go to two areas). Ends of pipes either have plugs with ⅛-in. perforations or are flattened to give a spray effect. Distances from fumigating panel to points of application vary from 10 to 50 ft.

Treated in succession are six 200,000-lb. capacity malt bins, two 200,000-lb. capacity grits bins, up and down sections of corn elevator boot, two malt mills, cooker hopper and elevator, up and down sections of malt elevator boot, and up and down sections of outside elevator boot brining malt and grits into bins, malt hopper, and corn hopper.

These are the doses: 3 lb. of fumigant for a full bin and 5 lb. for an empty one; 3 lb. for each bucket elevator; 2 lb. for cooker hopper and elevator; and 1 lb. for each malt mill.

Notable savings in amount of fumigant have been achieved. When the new system was first employed, 24 lb. of fumigant was shot into each bin. Now 3 lb. is sufficient.

Fumigations are carried out every other Saturday morning when the brewhouse is shut down and no workers are on the job. Doors are locked with keys carried only by the fumigator and his assistant. And signs reading "Danger—Fumigating" are posted at all areas under treatment.

After the 20 spots have received their required doses, 5 hr. is allowed to pass. Then the fumigant is expelled. And 2 hr. later, areas are checked for fumigant with a halide leak detector. Brewhouse is then opened up.

A simple practice was discovered to prevent caking and save subsequent cleaning of the orifice of the ¼-in. copper piping. The trick merely involves cracking, for example, the valve to deliver fumigant to No. 2 bin just before closing the valve to the No. 1 bin. This way, grain dust around the orifice of the pipe to No. 2 bin is blown away.

As a safeguard, two precautionary measures have been taken: First, an outside entomologist makes thorough, periodic checks (and, interestingly enough, he's found no evidence of insect infestation). Second, the brewery has a portable fumigating cylinder (10 lb. capacity) for spot-dosing other areas where there might be a likelihood of infestation (as yet there has been no such occurrence).

For this latter extra treatment, a cylinder of fumigant can be hooked up with a 4-ft. length of copper pipe (¼-in. dia.) that can be easily bent to shoot the gas around corners.

Most breweries keep their brewhouses operating around the clock. And they cannot afford to waste production time by employing bulk fumigants in treatments taking up to 24 hr.

Carling was faced with this dilemma. And it made what might be called a compromise. It substituted faster insect-killing methyl bromide for bulk fumigants, thereby assuring destruction of possible insects for 6 to 8 hr. instead of 24. But large doses of methyl bromide had to be employed for speedier kills.

Then came the discovery of a low-dosage fumigant (effective at dosages 25% lighter than methyl bromide). Now employed in this brewery, this is Dawson Fumigant Formula 55*, which has equal amounts (by weight) of methyl bromide and ethylene dibromide.

Synergistic properties of both produce a fumigant of high potency, effective at low dosage. And the two basic active ingredients can be tailor-made to produce fumigants of different volatility levels—for example, low volatility for spot and grain fumigation, and high volatility for space fumigation.

*Discovered by J. Carl Dawson & Associates, St. Louis, and manufactured and marketed by Ferguson Fumigants, Inc., Ferguson, Mo.

End (*Resume reading on page 66*)

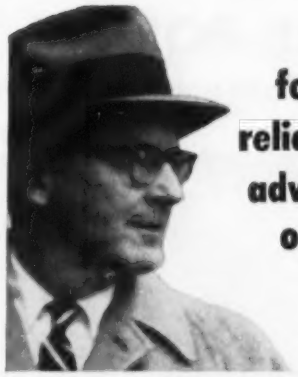
Dry-Product Packager

—*Continued from page 96*

level through an adjustable inlet gate. As the arm rotates, a full cup lifts and dumps its load into a "duckbill" holder that is poised above the package. This dips into the positioned envelope, opens, and deposits its charge of gelatin without spilling a grain.

As packages move to the end of the filling chain, they are picked off by a vacuum arm and deposited in the cartoning section. Here, a vibrator shakes them flat. When four envelopes have accumulated on top of each other, the recipe booklet is added, then all are slid into a carton by a ram. Cartons are formed from "flats" in a separate device.

An interesting angle in this opera-



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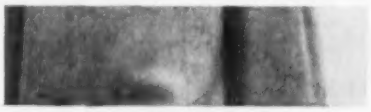

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MANAGEMENT: INTERNATIONAL EXPOSITION COMPANY
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tion concerns the addition of the recipe inserts. Such items are notoriously difficult to handle, because of their light weight.

But the new machine eliminates this trouble—by means of a vacuum cup device that insures positive, fast placement of the booklet.

Complete package is elevated to a compression sealer, then subsequently passes over a conveyor and through an accumulator to a continuous check-weigher (Selectrol). This latter control instrument serves to eliminate any "overs and unders".

End (Resume reading on page 97)

Seals Enrichment on Rice

—Continued from page 93

ough coating of the rice with vitamin solution. After this the exhaust damper, connected to a fan on the roof, is opened. Then speed of the trumbol is reduced to 6 rpm. for effective drying of the solution on the grains, making them free-flowing without stickiness. Total mixing time is 50-60 min.

Next step is to apply half of the coating solution to the rice. Trumbol speed is now again increased to 12 rpm., and cars filled with iron-talc mixture are placed on the track and slid into the unit. Cars move on rollers and have guides which hold them to the track so they may be up-ended. Operator turns the track-crank slowly to permit good distribution of powder on rice until half the required iron-talc is introduced.

After 10 min., the exhaust damper is opened, and shortly thereafter speed is reduced to 6 rpm. Product is trumboled (50-60 min.) until it loses its stickiness and a slight polish appears.

Entire operation is now repeated with the second half of the ingredients. Then 74¾ lb. of talc is added, and product is mixed until stickiness is not noticeable and gloss has been acquired.

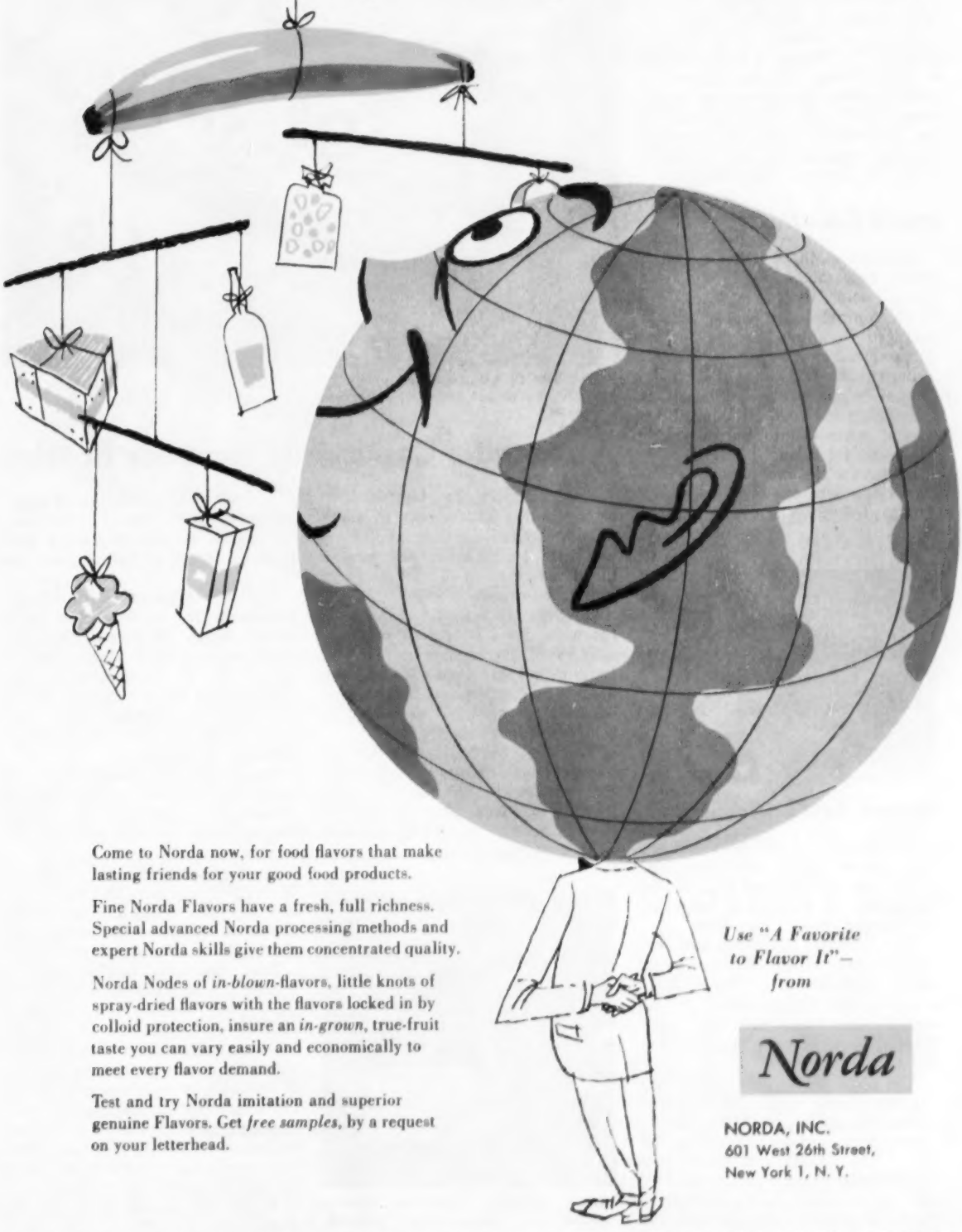
Finished, enriched rice (premix) is then emptied from the trumbol. In storage, the premix retains an odor of isopropanol for several days, in which time the coating slowly hardens. During this hardening period, the product must be handled gently.

As required, premix is automatically proportioned and mixed with white milled rice.

The resulting vitamin-mineral enriched product meets the requirements of Puerto Rico and also those of Hawaii and the Philippines—lands where anti-beriberi and pellagra-preventive factors are most pertinent.

End (Resume reading on page 94)

This banana helps sell more good foods for a big bunch of reasons



Come to Norda now, for food flavors that make lasting friends for your good food products.

Fine Norda Flavors have a fresh, full richness. Special advanced Norda processing methods and expert Norda skills give them concentrated quality.

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NEW PACKAGES & PRODUCTS

Cheese Stuffed Wieners

Called Cheezdogs, new frankfurters with a core of cheese are being test marketed in Arkansas by Little Rock Packing Co. Product is made through a device which may be attached to most standard wiener-making equipment. Sold under Arkansas Maid label, Cheezdogs are processed through franchise granted by the Cheezdog Corp. of America, Little Rock.

Pound Cake Mix

Reported as the first of its kind, a pound cake mix has been marketed by the Dromedary Co. Fifth cake mix in the company's line, the product is packaged in an attractive gold foil wrapped carton.

Each package includes a sheet aluminum baking pan. The housewife adds an egg and milk to the mix, beats it, and pours it into the disposable baking tin for baking.

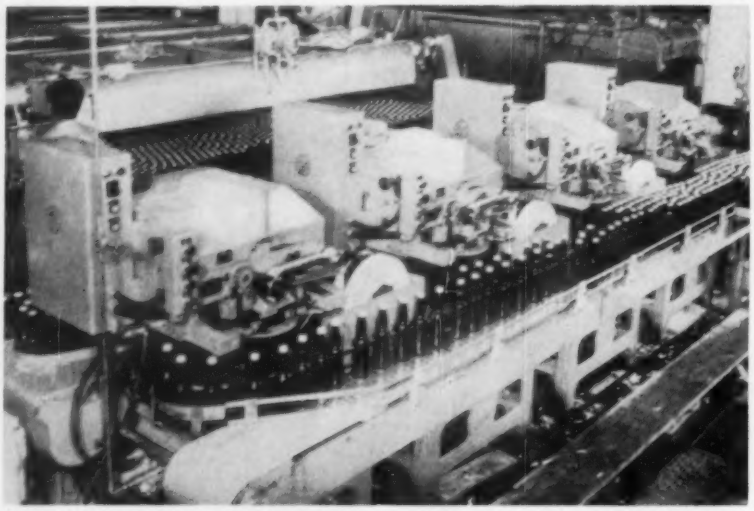
Recipe for the mix is said to have been inspired by one made famous by Thomas Jefferson's daughter at Monticello.

Instant Salad Dressings

Packaged in colorful foil envelopes, two instant salad dressings—garlic cheese and old fashioned French—are distributed by Van-Frank Sales Co., Los Angeles, under Lawry label.

The dressings are mixed with oil, vinegar, and water. Each envelope makes eight servings. The packages are laminated aluminum foil, providing moisture resistance, and light-proofing, as well as a high gloss printing surface.

The garlic cheese dressing contains dry bleu cheese, sugar, salt, imported anchovies, garlic, parmesan cheese, spices, lemon powder, flavoring and algin. The old fashioned french dressing includes sugar, Lawry's seasoned salt, garlic, spices, MSG, hydrolyzed vegetable protein, lemon powder, and herbs.



FOUR BANDERS operating in Pfeiffer Brewing Co., Detroit, seal bottles at 75 per min., up to 260 per min. in tandem.

Automatic Cap Bands for Beer Bottles

Pfeiffer Brewing Co., Detroit, is reported as the first brewer to adopt cellulose bands for bottles. The brewer has based an extensive new promotional campaign on the band and its consumer features.

Covering cap and part of the neck, the white band is applied automatically by fifteen banders in plants at Detroit and St. Paul, Minn. Ten more of the banders have been ordered from the manufacturer, the George J. Meyer Manufacturing Co.

Advantages are flavor protection and increased sanitation resulting from the fact that the bottle mouth is never touched by hand after sterilization. Both features are pointed up in a neck label below the band.

NECK LABEL indicates "flavor-sealed" and extra-sanitary features of band.

The machines are capable of applying the bands at a rate of 75 per min., but may be installed in tandem lines to attain speeds of 260 or more per min.

The rolls of bands are fed into position over the bottles before being cut to length. A starwheel-feed indexes bottles into position. Band is opened by a combination of mechanical and vacuum actions before positioning over bottles. It is then mechanically stripped off a plunger and onto the bottles.

Simple and fast changeover to different size bottles is possible through attachments. Operators are needed only to renew the rolls and supervise machine operation.

In most operations, the bands dry in shipping cartons. At Pfeiffer, special electronic ovens dry and shrink the bands as soon as the bottles leave the machines. This speeds production.

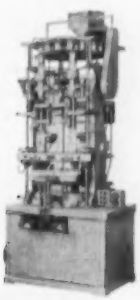
The automatic bander used by Pfeiffer may be equipped with an electronic feed mechanism to automatically cut printed stock. An electric eye determines band length before cutoff to insure positive registration. It can also be supplemented with a bottle-spotting mechanism for positioning accurately. This is particularly important to bottlers who must band their product so tax stamps are visible through a transparent window.

Bands are manufactured by Du Pont.

Circle 162A on Reader Service Card

PROTECTED BY RIEGEL

M & M's PEANUT CANDIES USE POUCHPAK*. . . MADE, PRINTED AND HEAT-SEAL COATED BY RIEGEL. PACKAGES ARE STRONG YET EASY TO OPEN . . . STACK NEATLY ON COUNTERS WITHOUT SLIPPING OR SLIDING. *T.M.



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WRITE FOR BULLETIN 350

PALMER

THERMOMETERS, INC.

Norwood Ave., Cincinnati 12, Ohio

Mfrs. of Industrial Laboratory Recording and Dial Thermometers

BRAN BREAD and "Old fashioned" hearth-baked bread introduced recently.

New Breads, Packages at Bakery Show

Three new types of bread and three novel new packages for bakery products were introduced recently, some at the last month's meeting of the American Bakers Assn. and the Bakery Equipment Manufacturers Assn. in Atlantic City.

Made with Kellogg's All-Bran, Sunrich bread was introduced at the convention, packaged in a bright red and yellow wrapper. It was developed by the Kellogg testing kitchen.

Each loaf contains 25% All-Bran, giving it a unique and tasty flavor. Franchising agent for the bread is Specialty Bakers' Services, Inc., Detroit (164A).

Pepperidge Farm is marketing a bread made from pure corn meal and molasses. Available in the New England area since early summer, the bread is now distributed in metropolitan New York.

Straight From the Hearth

Heralded as "the bread that takes its time," Hearthstone White Bread is a new product of Arnold Bakers, Inc. Developed after four years of experimentation, the bread is baked slowly on traveling hearthstones rather than on metal trays. The hearthstones are reported to reflect the heat more evenly and softly through the bread. The result is a deeper crust and a "home-baked" flavor.

FIRST foil-wrapped bread loaf.

Displayed at the Atlantic City convention, the 1-lb. loaf is stubby in shape. This is the result of an intensive search for bread pans which resembled those used for home baking. Ingredients are the same as those used in the other Arnold breads.

Bread in Foil

Said to be a "first", a foil lamination is being used to wrap Grocer's Baking Co. bread in Louisville. The package adds eye appeal and flavor protection to the loaf.

Supplied by Reynolds Metals Co., the material is a lamination of foil, wax, and paper. It is reported to keep bread edible for twelve days after baking, five days longer than conventional wraps (164B).

The foil may be reused to wrap food for cold storage.

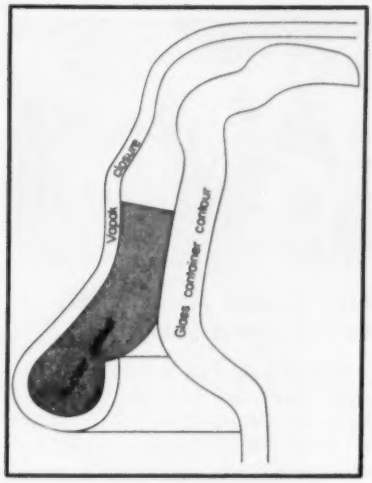
Marathon Corp. featured a new pressure-sealed carton at Atlantic City. The new carton reduces locking problems, provides more design surface, and gives package rigidity. It is suitable for packaging of rolls, biscuits, and other ready-formed items.

Four-color sacks are used by Russell-Miller Milling Co.'s Occident flour. Using a background of bright orange, the package is a contrast to the standard white sack formerly used by the company. White is still prominent in the design to emphasize purity, the orange, blue and yellow add to eye appeal and quick identification.

Label design has been simplified and brightened to fall in with the "modernizing" effect of the color.

Three-dimensional cake decorations were on exhibit at the Westco Products booth at the convention. Sculptured in sugar, the decorations are mounted on cardboard. Placed on the cake frosting, they soften and are fastened securely (164C).

Circle Key Nos. on Reader Service Card



New Vacuum Closure

Called Vapak, a new press-on vacuum closure has been introduced by Owens-Illinois Glass Co. Developed primarily for the baby food industry, the cap proved so popular, says manufacturer, that it is now produced in sizes to fit all food containers.

The cap is easy to remove, and will provide an airtight seal when reapplied.

A rotary sealing machine was developed by the company to apply Vapak closure, and is capable of speeds up to 700 jars per min. This might allow the processor to cut time between peeling and packaging of foods to as little as 10 min. Straight line machines may be used where speed is not a factor.

Sealing principle of Vapak is illustrated above. Glass container contour shows built-in. bead at top, which provides protection against "blow-off" in retorting, and conical design which helps maintain uniform seal tightness. Sketch shows how closure seats on conical part of finish, preventing contact with top of container.

Circle 165A on Reader Service Card

Enveloped Tea Bags

A tasty blend of Darjeeling and Assam, Indar brand tea is distributed in New York by Rallington Corp. Individually packaged tea bags may be

Printing Costs..... $
Wrapping Materials.... 2500.00
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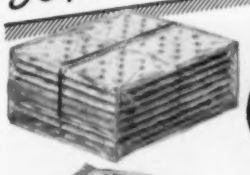

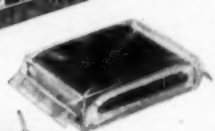

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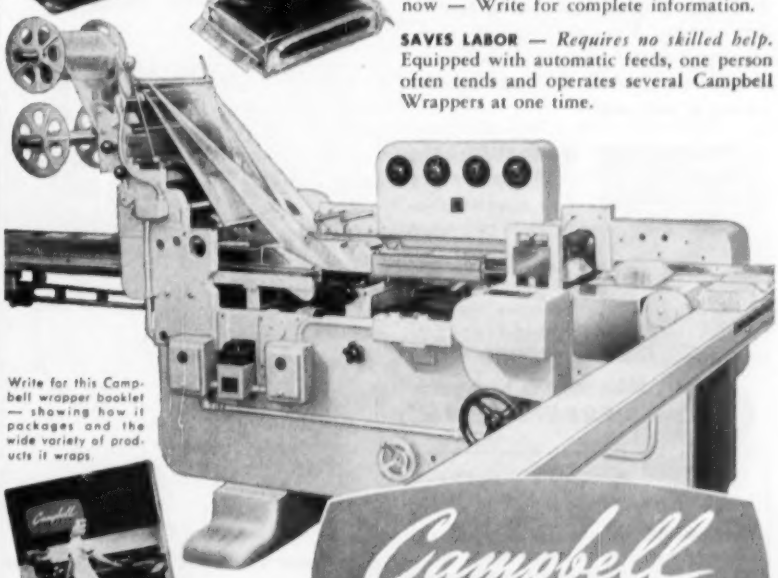

Write for this Campbell wrapper booklet — showing how it packages and the wide variety of products it wraps

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used to make three cups of tea, sometimes even four.

Imported from France and Belgium, the tea bags are packaged on a machine of the company's own design. The tag for the tea bag string is actually a detachable panel of the envelope.

The company also markets loose tea in colorful gold tins.

Spaghetti Sauce Mix

Introduced by Pompeian Olive Oil Co. recently was Italian-style spaghetti sauce mix. A dehydrated blend of spices and herbs, it is combined with tomatoes or tomato paste to make a uniform sauce.

Package is a combination of pouch paper, aluminum foil, and polyethylene. Each packet serves five people. Two of the envelopes are combined in a larger package.

New Cereal Assortment, Institutional Items

Called Treat-Pak, a new cereal specialty assortment has been introduced by General Foods. Six boxes make up the pack: two of Post Sugar Crisp, two of Sugar Krinkles, and two packages of Raisin Bran. Each Treat-Pak contains a coupon redeemable for 10¢ at the next purchase.

Processor has also made Nabisco Shredded Wheat and 100% Bran available to the food service industry. Post Sugar Krinkles will also be added to the institutional line. Nabisco products will be sold in containers of 50 1-oz., single-service packages and will also be added to Post A-100 assortment.

Redesigned Cereal Cartons

General Mills' Wheaties packages now are marketed in four different designs and colors. Changed to offer more appeal to children and to emphasize family appeal, new design retains the orange background, brand name and

2 New Carry-Home Cartons for Beer, Pop

Twelve 12-oz. bottles of beer may be carried in the sturdy carton designed for Gulf Brewing Co. by Foote Cone & Belding of Houston (left). Carton is called 12-Pak.

A novel 3-in-line carry-home carton is used for 16-oz. bottles of Canfield's Ginger Ale and Slim Line beverages. Cartons have automatic bottoms and full depth partitions.

Both carriers are manufactured by Atlanta Paper Co.

Circle 166A on Reader Service Card

slogan, "breakfast of champions", but features the silhouette of a mother, father, brother or sister face. The profiles are blue, brown, red, and yellow respectively.

Cheddar Cheese Pretzels

Retaining flavor despite high baking temperature, cheddar-cheese flavored pretzels are being baked by Becker Pretzel Bakeries, Inc., Baltimore.

The pretzels are marketed in two standard sizes in bright red, green, and yellow bags. Price area on the bag is shaped like a cheese, emphasizing the distinct flavor.

New Product Shorts

Four Mixes introduced by Wilkins-Rogers Milling Co., Inc., Washington, D. C., feature "one bowl preparation." Mixes are buttermilk corn bread, corn muffin, spoon bread, and bran muffin.

Seasonal Delicacy, prepacked frozen 10½-oz. mincemeat pie, has been made available all year round by Armour and Company.

Newest Jelly in H. J. Heinz Co. line is strawberry.

Vacuum Sealing will be used for a complete line of frozen stuffed poultry soon to be marketed under the Duncan Hines label.

Dutch Chocolate Ice Cream, packaged under the Elsie label, is being distributed in New York City area by Borden Co.

National Distribution has been announced for cakes made by Kitchens of Sara Lee, Inc.

Frozen Herring cutlets in sour cream sauce and in wine sauce are being marketed by Booth Fisheries Corp., Chicago.

Zebra Casings, tinted blue-striped coverings for skinless franks, are made by Tee-Pak, Chicago.

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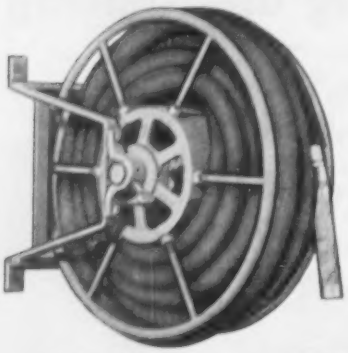

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Checking on Sanitation

—*Continued from page 78*

the features of new and advanced processing machinery, relative to sanitation, efficiency, and promotion of product quality.

Looked into, too, are the materials of its construction and the ease of dismantling, cleaning, and re-assembling it. And, before buying, we must know if the equipment is corrosive, or if our products will pick up contaminating materials.

A word here, sanitation-wise, on our facilities and practices: We have specially accented the use of stainless steel pipes, fittings, valves, machine parts, and utensils in direct contact with our confections. And we also have put emphasis on facilities designed without dirt-catching corners and seams.

Further, we have stressed employment of processing units that are totally enclosed to keep out contamination. We likewise make certain that contamination is doubly curbed by filtering incoming "raws" 'and picking up any foreign metals through installation of permanent magnets in the equipment.

Extreme precautions are taken to make sure that no contamination takes place during shipment, receipt, and storage of our raw materials.

Cleaned 10 Times

For example, at the storage facilities away from our plant, the popcorn is mechanically cleaned four times before it is loaded into thoroughly washed and fumigated box cars. These carriers are also inspected, prior to loading, for loose boards, contaminating odors, etc. Fumigant employed is a methyl bromide-ethylene dichloride-carbon tetrachloride mixture.

When weather does not permit washing, box cars are cleaned with the aid of a permanent vacuum system installed at the car siding. And samples are collected for analysis before the car rolls on to Chicago.

Then, upon arriving at our plant, the popcorn is stored in sealed, concrete bins. Handling system from bins to popping machines is also totally enclosed to minimize contamination.

But equally important, the popcorn gets six cleanings at the plant—making a total of ten cleanings before it is popped. This plant routine comprises two aspirations, three screenings in the Howe cleaner, and one in an electrostatic separator.

Installation of this latter unit permits an efficiency in removal of foreign material that heretofore was thought impossible. The nine-times-cleaned popcorn is exposed to a static charge of 25,000v., with impurities separated from the stream of corn (see drawing).

The laboratory collects, three times daily, foreign-material samples from the electrostatic cleaner. These are examined to check efficiency of previous cleaners.

Other Ingredients Also Checked

Simple precautions also are taken to keep nut-borne insects out of the plant. Our peanuts are held in cold-storage warehouses in Southern states, with small shipments made about every third week.

Incoming shipments are lab-sampled and analyzed. Then the peanuts are cleaned several times, and they are visually inspected on traveling belts.

Finally, our syrups and molasses are stored in sealed tanks, and they are distributed through the plant in a closed system.

End (*Resume reading on page 79*)

Small Plant

—*Continued from page 95*

by individual temperature controllers on two panels. As temperature rises, a green light flashes on to indicate 180 F. Then, at 224 F., a red light signals the endpoint, and steam is automatically cut off to finish the cooking process.

Product is now ready for packaging on the lower level. It flows by gravity to a 10-spout filler that handles 8-oz. to 4-lb. jars. Filled tumblers go to a vapor-vacuum sealer and capper, then to a coder.

Jars Are Spray-Cooled

Next comes cooling to prevent color loss. Capped jars, at 180 F., make a 20-min. pass through a cooler, and exit at 70-80 F. In traversing the cooler, tumblers get three successive, temperature-controlled water sprays. The first is at 90 F., the second at 75 F., while the third is with cold water.

Cooled jars then go to two 70-a-min. labelers. These take a wide variety of labels with minimum adjustment. Casing—the only non-automatic operation in the line—follows labeling, after which cartons go to a case sealer.

Loads are palletized and sent to storage by fork truck.

End (*Resume reading on page 96*)

NATURALLY manufacturers take every possible precaution to avoid contamination in making their products. Don't let *your* quality control end there by shipping your product in containers that are not 100% free of scale, grease and dirt. With USS Steel Drums you can maintain product purity right to your customers' door. Here's why:

AFTER each USS Steel Drum has been carefully shaped, formed and welded, a strong alkali bath cuts away all dirt and grease. Next, the interior *and* exterior are completely descaled. This process is followed by saturating all surfaces with a special phosphate solution that retards rusting. These three careful steps are an assurance that your product, shipped in USS Steel Drums, arrives pure . . . always! USS Steel Drums are available in a wide variety of shapes, sizes and finishes . . . plain or decorated.

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INSIDE SCIENCE

The Vital Story of VITAMIN A

by Science Writer

We live in a golden age of the sciences!

In the science of nutrition discoveries of food elements and their action have resulted in the promise of better health for us all.

Let's consider vitamin A as an example.

A Capsule History. 1913 was the year. Two teams working independently with animal feeding experiments discovered that a diet which was good in all other respects but which varied only in the source of fat caused young animals to thrive or sicken as the fat was varied. The work of these teams (McCollum and Davis; Osborne and Mendel) led to the discovery of the food factor which we know as vitamin A.

Composition and Action. A pale yellow, oil-soluble substance, vitamin A is expressed in the chemist's shorthand as $C_{20}H_{29}OH$. It is necessary in the diets of men and animals to promote the body's growth and development. Vitamin A is a vital requirement in guarding the health of the eyes and skin, and for resistance against infection. It helps maintain the health of mucous membranes and other specialized epithelial and glandular tissues.

Vitamin A enters the body as a constituent of food. Or it may be created within the body when a precursor of vitamin A is eaten. A precursor is a food element with potential vitamin A *value* but no actual vitamin A *content*. For instance, many green leaves have a high vitamin A value but, paradoxically, contain no actual vitamin A. The body converts the precursor into the vitamin. The most common precursor of vitamin A is beta carotene, the natural yellow coloring of many foods, such as dairy products, cereal grains, carrots, alfalfa, etc.

When consumed in food vitamin A is absorbed primarily in the healthy intestine, is esterified in the intestine's walls and is carried as an ester in the lymph and blood to the body's storage depots. The liver, which has a large capacity for storage, contains about 90% of the vitamin A found in the body.

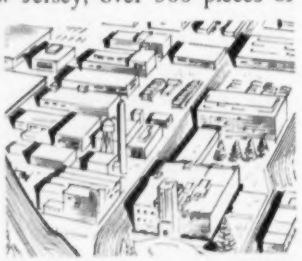
Isolation and Synthesis. It was not until 1937 that pure, crystalline vitamin A was isolated by Holmes and Corbett from fish-liver oil. Research in the synthesis of vitamin A was stimulated during the Second World War by the threat to natural sources in fish-liver oil. This work resulted in several processes to produce vitamin A synthetically. Of these, one of the most successful was evolved by the Roche research team headed by Dr. Otto Isler which was announced in 1947. Much of the vitamin A now used for pharmaceutical manufacturing and food fortification in the United States and many other countries of the world is produced by this process.

Vitamin A and beta carotene produced by the Hoffmann-La Roche synthesis have many positive advantages for food and pharmaceutical manufacturers. Among these are the complete absence of any "fishy" odor, taste, or after-taste; the reasonable and stable price; their stability, purity and uniformity and the assurance of a steady economical supply.

Vitamin A is described in the U. S. Pharmacopoeia as a fully acceptable compound for use in pharmaceutical products. The U. S. Food and Drug Administration has approved its use for the fortification of margarine and other foods.

Human Requirements. The Food & Nutrition Board of the National Research Council recommends that a daily allowance of 5000 International Units of vitamin A in the diet will maintain good nutrition of healthy adults in the U.S.A. The Board's recommendations vary above this for pregnant and lactating women, and below for infants and children. The adult dose used in therapy may vary from 50,000 to 200,000 units daily.

Production. At the huge Roche Park plant of Hoffmann-La Roche in Nutley, New Jersey, over 500 pieces of large-scale chemical engineering equipment are working constantly to produce the superior 'Roche' vitamin A. This production is so large that 'Roche' vitamin A comes from the plant actually by the tons. In fact, the entire needs of the food and pharmaceutical industries of the United States and Canada can be met from this one plant.



Again the Roche people, who have so often led the way in vitamin research and production, have made another contribution to the better health and well-being of countless millions.

This article is one of a series giving a brief resume of our present knowledge of those essential health factors—the vitamins. Reprints of this and other articles are available without charge. The Vital Story of Vitamin C was published previously and others are forthcoming. Send your request to: Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul St., W.; Montreal, Quebec.

ADVANCES IN TECHNOLOGY

Lecithin In Baked Goods

Addition of lecithin to the bread formula results in the following benefits: Increased loaf volume, more shapely loaves or rolls, better crust color, better oven development, and better crum color, sheen, softness and spring.

It increases the resiliency of the dough enabling it to stand up well under severe mechanical treatment in the dividers and molders.

Commercial lecithin can be used either as an emulsion or in its natural raw condition. In the former case, it surrounds and lubricates protein molecules, giving the gluten increased elasticity and swelling power. Emulsion is formed by mixing 1 lb. of lecithin in 1 qt. of hot water. The same strength can be used for practically all bakery products. For bread it is used at the rate of 1 lb. 5 oz. per sack of flour. Raw lecithin is used at the rate of 6 oz. per sack of flour.

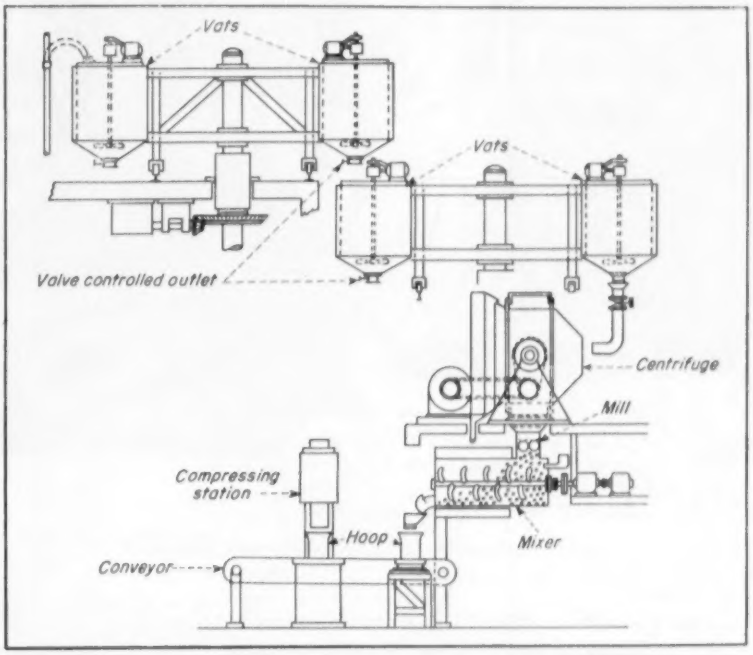
Precise level at which lecithin is used should be determined for each recipe, because excessive use will cause loss of volume in the product. Depending on the recipe and process, the correct quantity is 1-2% of fat used. Recipes are given for a variety of bakery products.—*Food Manufacture*, 370-71, Sept. 1955.

Improved Bakers' Yeast

Selective culture of a bakers' yeast having ability to metabolize glutathione is the novel feature of a patented process for making an improved active dry yeast.

The invention resulted from search for a yeast that would eliminate or reduce the so-called proteolytic effect in bread—coarse crumb texture and low-volume loaves. All yeasts used heretofore are characterized by high glutathione content, 7-12 mg./1 g. of dry solids.

According to the invention a large number of single yeast cells were isolated from a mass of bakers' yeast exposed to conditions that favored mutation and sporulation. A vigorous culture that showed ability to utilize glutathione as a source of sulphur was selected for further propagation and processing into active dry yeast. Comparative baking tests with this special culture and the parent culture showed the superiority of the improved yeast in making bread of more acceptable quality.—U. S. Patent 2,717,837, Sept. 13, 1955.



Continuous Cheese-Making Process Eliminates Most of Manual Steps

Minimizing manual operations previously required in the making of cheese is the intention of a recently patented invention.

Employed in the process are machines that speed coagulation of curd, cutting and separation of whey therefrom, then perform the cheddaring, salting, and delivery to hoops or forms for the permanent set for curing and aging (see drawing above).

One type of equipment employs jacketed vats mounted to turn on a central vertical support. Each vat receives a measured quantity of heated milk, starter, rennin, color, etc., and mixes them thoroughly as it slowly rotates. When it indexes with a similarly constructed vat disposed and rotated below it, valve-controlled outlet opens and allows milk to flow into lower one.

Temperature of milk in both vats is held at desired point by circulation of heating medium through their jackets. In the lower vat the milk remains quiescent until curd is set. Then a knife is inserted and cuts the curd into 1-in. cubes. Agitator is started and temperature of mass is raised in order to cook the curd.

By the time the vat reaches emptying station curd is conditioned for separation from whey and for cheddaring. These steps are performed in a special basket type centrifuge that is loaded with the basket in a horizontal position, then swung to a vertical position for centrifuging.

Unit is first operated at 40-75 rpm. to separate majority of the whey. Then it is slowed to about 12 rpm. at which speed the curd is loosely held against outer wall of basket. By this method, additional whey is removed similarly to the conventional cheddaring operation. Resulting curd has the proper moisture content, texture, and other properties necessary to produce matting.

Then basket is turned to enable the curd to fall into a suitable grinder where it is milled. Salt is proportioned into the curd at this point. Milled curd and salt then fall into a mixer equipped with paddles or blades which thoroughly disperse the latter in the former. Mixture discharges through a chute and funnel into hoops or forms which are then conveyed to a compressing station where a power driven plunger compacts the curd.

Hooped curd is allowed to stand for sufficient time to produce a permanent knitting, then hoop and bandages are removed and the green cheese handled in conventional manner. — U. S. Patent 2,717,212, Sept. 6, 1955.

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Water treated with ozone has no deleterious effects on yeast, and, in fact, seems to improve keeping quality and color of compressed bakers' yeast, and to influence its baking properties favorably.

The ozonizer used (Chlorator, G.M.B.H., Grötzingen/Karlsruhe) consists of an air drying and filtering system and a series of four ozonizing tubes.

The air is drawn through the drying system and through two series of tubes connected in parallel, by water injectors which use 5 cu. m. (1315 gal.) water per hr. and aspirate 0.9-1.0 cu. m. (30-35 cu. ft.) of air per hr into the water storage tank.

Unit produces about 20g. ozone per hr. and, over a 6-month period, used 0.42 kw./hr. at 380v., applying a potential difference of 9000v. to the ozonizer tubes. About 21w. are required for the production of a gram of ozone.

Ozonized water direct from the unit contained 4 ppm. ozone; treated water in the storage tank 0.3 ppm., which dropped to 0.1 ppm. by the time it was actually used.—*Brauwelt*, 857-59, 1955.

Shrimp Peeling Process

Subjecting shrimp to localized pressure to break connecting membranes then pinching and vibrating to eject freed meat from heads and hulls is the object of a recently patented process.

Process employs tiers of sponge rubber covered rollers to break membranes, water sprays, and means for separating meat from loosened shells. One section of a tier comprises rollers that are placed side-by-side, spaced slightly apart, and mounted on a frame for rotary movement. Frame is vibrated at high frequency by an electric motor.

Positioned above and in staggered, contacting relation with these rollers is a second set. Shaft of each roller in this set has a drive pulley on one end and a reciprocating mechanism on the other. Power may be applied to one roller and transmitted to remaining ones by a system of connecting belts.

As rollers of top section rotate, they are moved back and forth by the reciprocating mechanism. Also, they cause rollers on bottom section to rotate in the opposite direction.

In operation, shrimp are fed to the first pair of rollers and drawn into the nip between them. Here, heads and hulls are loosened from meat by

where throttled steam is a

valve killing "vapor drill"

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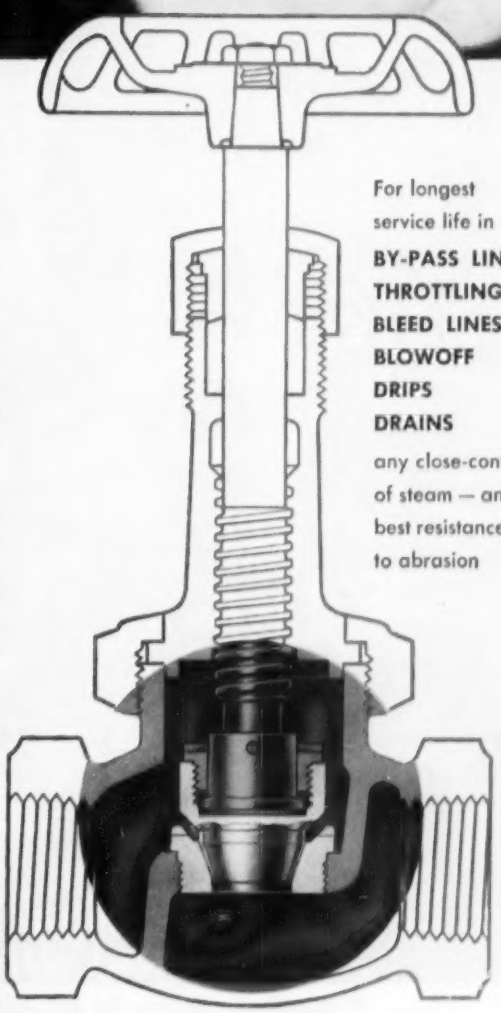
Make you own test . . . in your toughest steam service . . . or anywhere that abrasion or erosion causes frequent valve failure. Compare, part for part, with any similar valve. You'll find that, again, Jenkins *extra value* pays off in longer life and lower maintenance cost.

Plug and seat ring are Jenkins JX500, a Stainless chromium alloy steel made to Jenkins high strength specifications, heat-treated to 500 Brinell. Seating surfaces are super-hard and mirror-smooth, offer highest resistance to galling, cutting, abrasion, and erosion. Wide, steep, 30° total taper permits extremely close regulation of flow and vapor-tight closure.

The Stainless steel plug is securely fastened to the spindle with a bronze locknut. Spindle is aluminum bronze with a tensile strength exceeding 70,000 lbs., — has high corrosion resistance.



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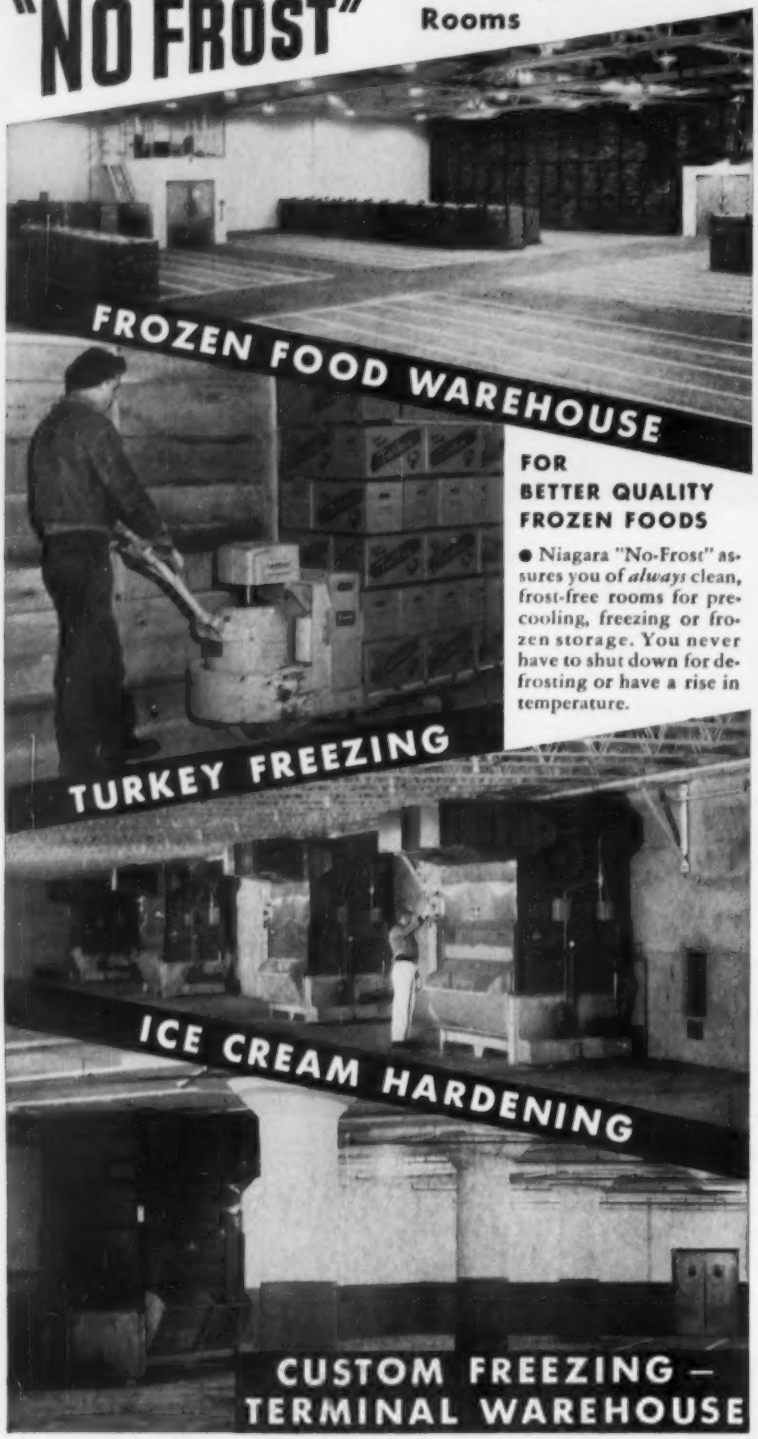
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the combination rotary and reciprocatory movements. And small pieces of shell are washed between bottom rollers. Shrimp then pass through separating means where larger pieces of hulls and trash are thrown into buckets and enter a second tier of rollers where the process is repeated.

Number of tiers and separating stations may be varied as needed to insure practically complete cleaning and peeling.—U. S. Patent 2,712,152½, July 5, 1955.

Frozen Pork Sausage Improved With MSG

When monosodium glutamate is added to seasoned and unseasoned pork sausage, the products are very acceptable after one year's frozen storage. And the seasoned sausage treated with MSG proved even more desirable than the untreated product after 4 month's storage.

Six groups of sausage were prepared: Unseasoned and seasoned controls; unseasoned samples containing 0.1% and 0.3%, respectively, MSG, two seasoned samples containing the same respective amounts of MSG. Sausages were frozen and subjected to a taste panel each month after 2 month's storage.

Despite some deterioration in quality, all groups treated with MSG were very acceptable after a year of storage. After 4 month's storage the seasoned group treated with MSG shows significant increase in desirability. After the same period, the seasoned sausage without MSG was much less desirable. Use of the larger amount of MSG was of no additional advantage. Little difference was detected between the unseasoned control and the seasoned and unseasoned groups containing MSG. — *Food Technology*, 340-41, July, 1955.

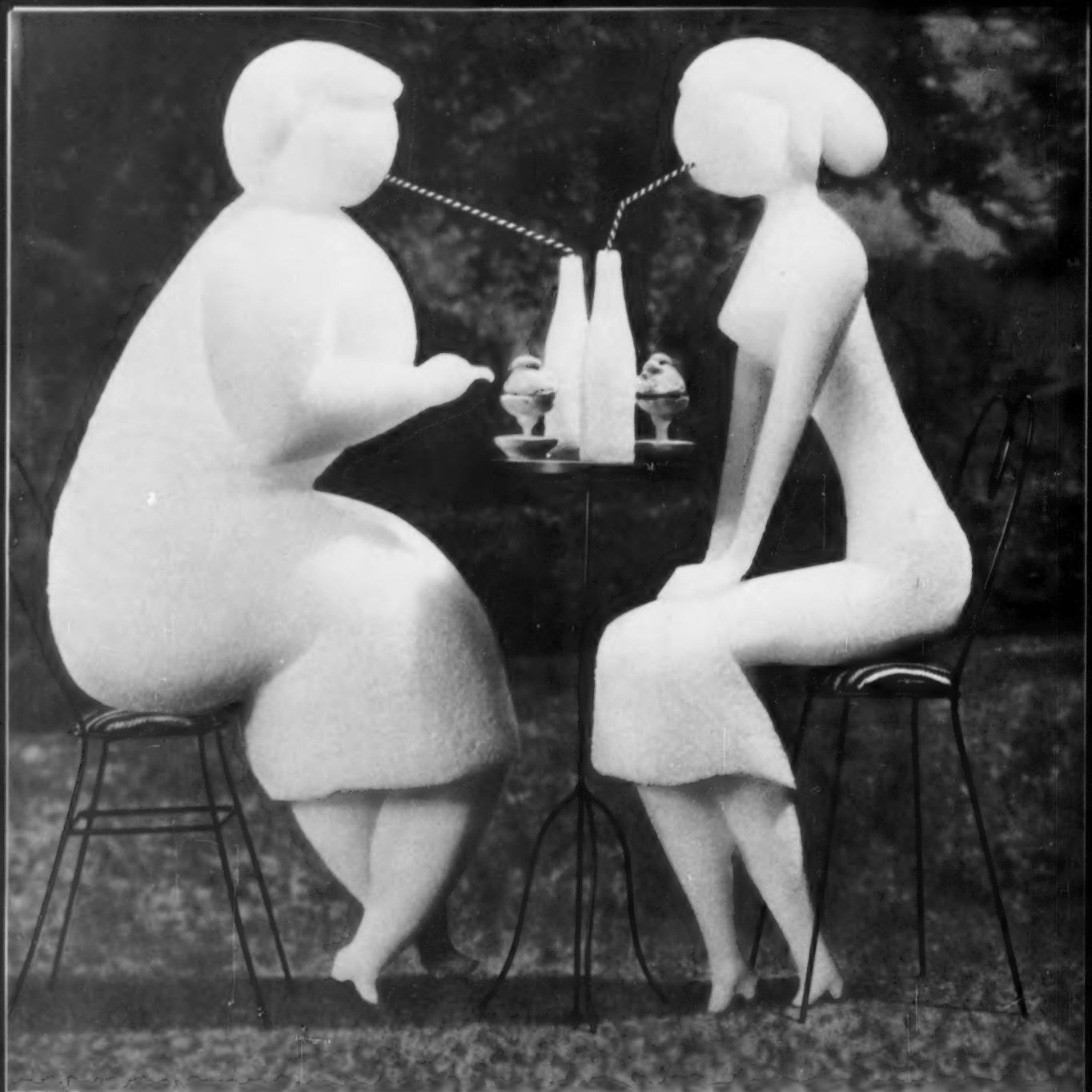
Ultrasonic Treatment Of Worts Detailed

In a brewery using two kettles to boil wort from a single brew, a strict comparison of effects of ultrasonic treatment was carried out, with parallel tests made on both worts and finished beers.

Ultransonation at 280 sono-watts was given for 30 min. before starting to boil, and continued throughout the boiling period of 75 min. Ultrasonated worts received 28.3% less hops than control worts.

In the ultra-sound treated worts, there was a greater separation of trub (3.5%); fermentation took a day less; 10-30% more bitter substances were

Could you use another customer?



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extracted from the hops (depending on hopping procedure); chill resistance of the beer was unaffected, but keeping quality (unpasteurized) was about 13% less; hop aroma was less marked, hop flavor was more delicate, and foam retention was improved.

Ultrasonic treatment gave lower-grade hops an aroma approaching that of higher-grade hops not so treated. The tests indicated favorable effects for ultrasonation except for beer keeping quality, and the keeping quality results should be accepted with reservations pending additional studies.—*Brauwelt*, 805-12, 1955.

Gage of Gas Losses In Bottled Drinks

Carbon dioxide losses through crown closures of bottled beer or soft drinks during normal storage are usually not a serious matter, nevertheless careful measurements will show that such losses can occur.

Observations have been made on individual bottles of beer fitted to an apparatus which collects the escaped gases for measurement after suitable time intervals, as well as by the decrease in average gas pressure in bottles during storage periods up to 12 weeks.

Bottles standing upright so that the crowns remained dry, decreased in gas content from 2.47 to 1.73 volumes in 12 weeks. A companion set lying on their sides so that crowns were wet dropped from 2.47 to 2.26 volumes in the same period.

Agitation that bottles receive during truck transportation reduces the gas loss, and if the bottles lie on their sides during transportation the losses are even less. Standing bottles had a better average fill after the transportation tests, suggesting that there is also a small liquid loss when bottles are shipped lying on their sides.

Bottles with crowns predried to 1.5-2.46% moisture by placing them in a dry atmosphere over CaO_3 or K_2CrO_4, showed greater losses of pressure after 11 and 45 days than bottles closed with crowns of normal moisture content, indicating the importance of not permitting crowns to dry out in storage.—*Brauwelt*, 1955 (65), 1057-62.

Sorbitol Test Detects Wine Adulteration

For detection of cider in grape wines, or of the sorbitol added to other beverages or fruit products, qualitative tests for sorbitol are often used. Litterscheid's o-chlorobenzaldehyde

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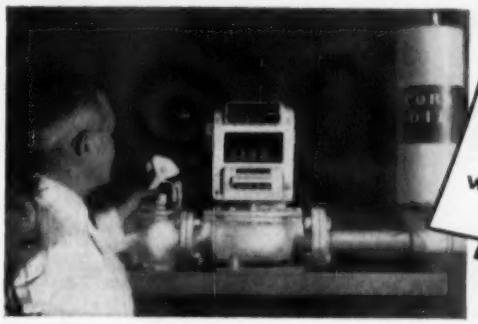
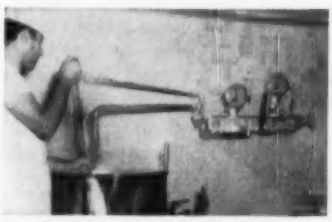


By eliminating human errors in blending expensive ingredients, this meter paid for itself in one month!

Speed batch mixing by putting a standard Auto-Stop meter in each liquid ingredient line. Gives you *accurate* quantity control . . . *automatically.*



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Eliminate losses due to rejected batches, spills and over-fills. Meters can't make "human" mistakes.

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INSTANT DIETETIC CHOCOLATE PUDDING

Dietetic pudding mix for preparing instant-type puddings easily made with MARGEL, specially prepared algin stabilizer for low calorie cold milk puddings.

MARGEL	18.3%
FINE QUALITY DUTCH COCOA	55.2
CALCIUM GLUCONATE USP	12.8
TETRASODIUM PYROPHOSPHATE, ANHYD.	7.4
SALT	3.6
VANILLIN	0.7
SODIUM SUCARYL	1.5
SACCHARIN	0.5
	100.0%

DIRECTIONS: Add a one ounce package of the above pudding mix to two cups of milk with stirring.

CALORIC VALUE:

Caloric value of MARGEL is about 1.0 calories per gram. Pudding made with this mix and 2 cups of skim milk will provide 4 servings at 59 calories each or 6 servings at 39 calories each. Algin stabilizers reduce or replace starch and sugars, cut calorie content way down!

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these **ALGIN ADVANTAGES** in your dietetic syrups, salad dressings and desserts

1) Gives desired viscosity and body.
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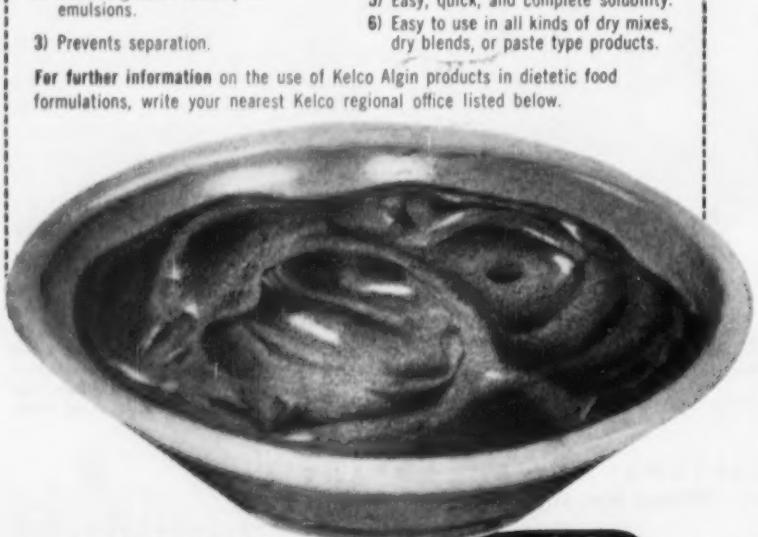
For further information on the use of Kelco Algin products in dietetic food formulations, write your nearest Kelco regional office listed below.



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test applied to the sugar-free residue after distillation of the alcohol and clarification with lead acetate, precipitates tri-o-chlorobenzene sorbitol, and gives a large quantity of material to weight. Its use has greatly reduced sophistication of grape wines with other fruit wines in Europe.

When used for quantitative estimation, recoveries of added sorbitol were 80-87% when 0.5-1.0 g. were present in 100 ml. In tests of red and white Bordeaux wines, five parts of cider (containing 120-510 mg. % sorbitol) mixed with 95 parts of wine could be detected with considerable certainty. —*Journal of the Science of Food & Agriculture*, Vol. 6, No. 7, 387-89, July 1955.

Speeding Cacao-Fat Tests With Refractive Indexes

Fat determinations in cacao beans or cholocate products are usually made by an extraction procedure which is time consuming.

Official method of the International Cacao—Chocolate Office requires an acid hydrolysis prior to fat extraction and takes about 12 hr. to complete. Results are very accurate, but method is too slow for a control procedure.

Extraction of fat in a Soxhlet apparatus is faster, but this requires at least 2½ hr. Centrifugal extraction can reduce the total time to about 2 hr., but all of these procedures are slow compared to a refractive index determination where only about 10-15 min. is necessary.

Comparative studies on the four methods, showed that Leithe's original formula for fat estimation from the refractive index of its solution in bromnaphthalene gives results that are too low when compared to those of the International method.

Recalculation of the table with newly determined constants yields concordant results and indicates that the method is highly satisfactory for plant control samples. The refractive index of cacao butter at 68 F. was established at 1.4647, and its density 0.913. —*International Chocolate Review*, 302-12, 1955. (In German).

Accurate, High-Speed Test Spots Penicillin in Milk

A quantitative test that can be performed in 2-hr. and is accurate for concentrations of less than 1 Oxford unit of penicillin in 1 ml. of milk has been developed.

Method is based on ability of penicillin to inhibit production of nitrite from nitrate by an actively growing cul-

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says John J. Ordille, Manager, South Jersey Produce Cooperative Assn., Inc., East Vineland, N. J.

"Proper curing and storage of perishable sweet potatoes requires exact temperature and humidity control," relates John J. Ordille, Manager, South Jersey Produce Cooperative Assn., Inc., East Vineland, N.J. "Even the heat gain through the roof on a bright winter day could be damaging . . . and condensation inside the warehouse might be disastrous. We rely on FOAMGLAS to prevent such damage to our crops. Here's why:

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Mr. Ordille concludes: "Our choice of FOAMGLAS proved a wise one during the past storing season. It was a big factor in keeping our crop in perfect condition."

You, too, will reap outstanding benefits when you insulate with FOAMGLAS. It *stays dry*, is fireproof, light in weight, yet strong and rigid. Get the full story! Send today for a sample and your choice of booklets describing the use of FOAMGLAS to insulate: 1) roofs, ceilings, walls and floors; 2) cold storage space; or 3) piping, tanks and other equipment. Write indicating your specific interest.

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In Canada: 57 Bloor St. W., Toronto, Ontario

Architect: J. A. Fletcher, Vineland, N. J.
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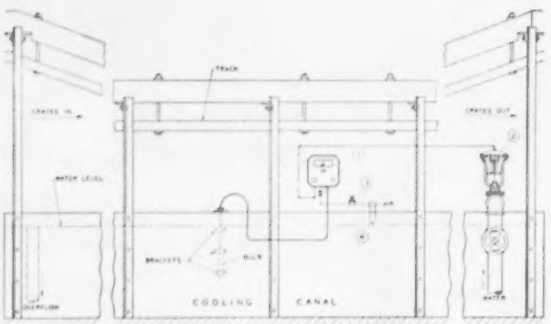
1 Taylor Cooling Canal Control System

Automatically controls inflow of cold water exactly in accordance with the cooling demand. This system will: prevent stack burning by automatically maintaining correct canal temperatures; cut down spoilage by preventing bacterial growth; prevent rust in storage by eliminating condensation caused by overcooling; save water.

Many of these systems have paid for themselves in less than a week's operation in the saving of cooling water alone.



2 Taylor Hot Water Control System

Assures a constant hot water supply within close temperature and level limits, even when the water is used intermittently for processing, thus preventing waste of water and fuel. In this system a FULSCOPE* Indicating Temperature Controller regulates a valve in the steam supply line to maintain the desired temperature of water flowing into the tank. A Recording Temperature Controller permits no water to leave the tank unless it is at the required temperature. An Indicating Level Controller can be set to maintain any desired level in the tank.

*Reg. U.S. Pat. Off.

3 Taylor Metering of Water, Steam or Air

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Taylor Instruments MEAN ACCURACY FIRST

ture of *M. progenes* var. *aureus*. Decreased nitrite production is measured colorimetrically following diasotization of sulfanilic acid and coupling with alpha naphtylamine hydrochloride.

To perform the test, 10 ml. of suspected milk is pipetted in a 6x⅝ in. test tube. An equal sample of antibiotic-free skim milk (control) is placed in another tube. To each is added 0.1 ml. 20% $NaNO_3$ solution and 5 ml. of a previously prepared suspension of *M. pyogenes*. After thorough shaking, tubes are tempered to 100 F., incubated for 90 min., then 1 ml. 15% trichloroacetic acid is added.

Contents are then filtered through No. 40 Whatman paper and 5 ml. of filtrate is mixed with 5 ml. nitrite-free distilled water in a test tube which is placed in an ice-water bath. One ml. alpha naphtylamine hydrochloride sol. is added and tubes allowed to stand 5 min. Color intensity is then measured by a Klett-Summerson photoelectric colorimeter using filter No. 56.

A standardized value, obtained by dividing reading of control into that of suspected sample and multiplying by 100, gives concentration of penicillin when referred to table in article. —*Journal of Dairy Science*, 829-34, Aug. 1955.

Cream Separated From Milk In New-Type Paper Bottle

An internal attachment that permits separation of cream from milk is the novel feature of a patented paper milk container of the conventional satchel-fold type.

Internal construction and arrangement of the container are such that cream and milk can be poured separately, depending on the manner in which the user manipulates the carton.

If pressure is applied against the front and back walls, as indicated on the carton, internal flaps close and permit cream to be poured from the cream compartment. If pressure is applied to the opposite side walls, milk can be poured from the milk compartment, bypassing the cream compartment.

Separating attachment not only permits selective pouring of cream and milk, but also reinforces the transverse shape of the bottle.—U. S. Patent 2,716,518, Aug. 30, 1955.

Stable Tomato Products

Increase in solids content of tomato concentrates is accompanied by certain disadvantages such as discoloration, scorched flavor, vitamin C loss.

you've got low-cost sanitation right in the palm of your hand

No bigger than a pipe bowl, yet the Hozon Unit does a mammoth job of helping to deliver low-cost spray sanitation. This unit, hooked up with an ordinary garden hose, permits regulated amounts of Oakite Bactericide to be sprayed from the hose nozzle. Makes sanitizing walls, floors, equipment—all areas—as simple as watering a lawn.

No higher than a hill of beans, yet this tiny amount of Oakite Bactericide is sufficient to make up a 10 gallon, 100 ppm solution of the best sanitizing agent available. It's Oakite Bactericide . . . with its near neutral pH that permits bug killing within 5 seconds after application. It's Oakite Bactericide . . . that mixes quickly, drains freely, and leaves no films or streaks.

No bulkier than a time-table, yet this handy descriptive folder is chock full of facts on how Bactericide and the Hozon Unit team up to drive spoilage out of your plant. It gives complete details on how the Oakite Hozon Unit works, how solutions are made up, where to use it.

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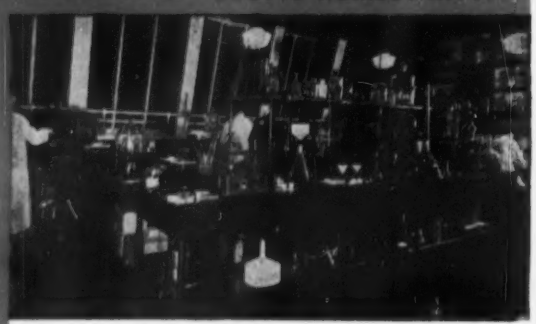

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This general conclusion was reached from experimental studies over a 2-yr. period on tomato products of varying percentages of solids, packed in tin, glass or enamel, and held at various elevated temperatures. Solids ranged from 5.6-38.4%, and temperatures from 37-100 F.

In summary, the more concentrated materials showed lower flavor and color scores, accompanied by a reduction in ascorbic acid content, as holding time and temperature increased. Products in plain tin cans ranked higher in both color and flavor than those packed in glass or enameled cans. Concentrated pastes showed progressive detinning of containers with increased holding time at the different temperatures. Copper and iron values were normal.—*Food Technology*, 466-70, Sept. 1955.

Sensory Tests Track Down Off-Flavor, Odor Sources

Development of off-odors and flavors in packaged products gives rise to some annoying problems which, however, can usually be solved by reference to trained taste panels.

The problems may involve contamination before packaging, absorption of odors during storage, residual foreign material in containers, and even the packaging material itself.

Three methods of sensory evaluation are available: (1) Comparison of two different products involving consideration of only one variable (paired comparison, duo-trio, and triangular tests are employed); (2) Evaluation of large numbers of samples, using rank order or dilution tests, with consideration of one or more variables, and (3) Complex test methods of scoring and profile studies in which more detailed information is obtained. Combinations of all three of the above mentioned methods may be desirable.

Examples of problems solved by these methods show wide variation. Scotch whisky with a sherry flavor was attributed to aging the whisky in sherry barrels. A frozen vegetable with a "cat" flavor, wrongly attributed to the packaging material was found to be due to use of an insecticide before packaging.

A phenolic off-flavor in green coffee was traced to contamination from a creosoted floor in a storage warehouse. Residual foreign material in drum containers accounted for a camphor flavor in liquid sugar, and lining material of a screw cap for mayonnaise was found guilty of an off-flavor in the product.—*Food Manufacture*, 281-84, July 1955.

Corn Syrup Points

—*Continued from page 105*

syrup, will lose its shape. This distortion is a function of temperature. In summer heat of 90 to 100 deg. F., it will be more pronounced than at 60 F.

The firmest hard candy with the least tendency toward shape distortion can actually be made by employing a 32-D.E. corn syrup. But this syrup has never become popular in making these confections because it has other production drawbacks.

Corn syrup, in general, is a desirable constituent in hard candy when correct amounts are used, since it is easier to produce those items without experiencing trouble with stickiness. This detrimental characteristic can, of course, be encountered if too much corn syrup is used.

However, a slight excess of invert syrup or cream of tartar is probably more often responsible (when either of these is used as an alternate means of controlling crystallization). Also, the condition can result from abuses of production.

All hard candy, especially the transparent type, should have a finished moisture content of less than 1% for satisfactory shelf-life. Stickiness is related to moisture absorption. If a regular corn syrup of 42-D.E. is replaced with high-conversion corn syrup to control crystallization, another additive factor may be introduced toward stickiness in hard candy.

Depending upon the amount of regular corn syrup used and that substituted for the high-conversion type, boiling point of the batch is raised 2 to 4 F. If this factor is not taken into account, the hard candy will not finish at the desirable moisture content of 10% or less. So, the candy must be cooked to a higher temperature or held longer under vacuum.

There is a group of ion-exchange-refined high conversion corn syrups that commands a premium, as more resistant to color formation.

The confectioner has depended on buffers present in regular corn syrup of 42-D.E. for control of inversion in candy batches. Ash (content 0.28%) in this syrup contains buffers that aid in preventing undue inversion of sucrose. High-conversion syrup produced without ion-exchange refining, with an ash content of 0.32%, acts in a similar way.

These buffers control stickiness. But ion-exchanged, high-conversion syrups with an ash content of .05% are practically devoid of these buffers. And the candy maker must take this into account—boiling to somewhat higher temperatures and for a longer time to avoid a contribution to stickiness.

This does not mean that satisfactory hard candies cannot be made with these syrups. Proper choice of containers and wrappings would aid. Also pertinent are exceptional care and considerable modification of the production processes, which do not have to be resorted to when using the more economical regular 24-D.E. syrup.

Brittles, crunches, chip candies, butterscotch, kisses, and taffies are related to the hard candies. With them, the viscosity change, possible tendency to flow, and raising of boiling point are critical factors.

Individual wrapping of the candies and the unit packaging can minimize the limitation of these syrups. In pulled candies of this type, viscosity increasingly can affect production difficulties. At any rate, high-conversion syrups do not find the ready acceptance of the regular.

In pastille work, high-conversion syrups must be increased to obtain the necessary body and protection against crystallization. An increase in gum arabic, gelatin, or other body-giving agents, usually adversely affects the eating qualities. Too large a proportion of corn syrup may result in sweating and stickiness.

Lack of body, as compared to regular corn syrup, also reacts unfavorably to the use of high-conversion corn syrups in Turkish paste. Same is true with halvah candies. Undue stickiness is also detrimental. These objections can be minimized by changing the cook. But these process changes raise the cost of production as compared with use of regular corn syrup.

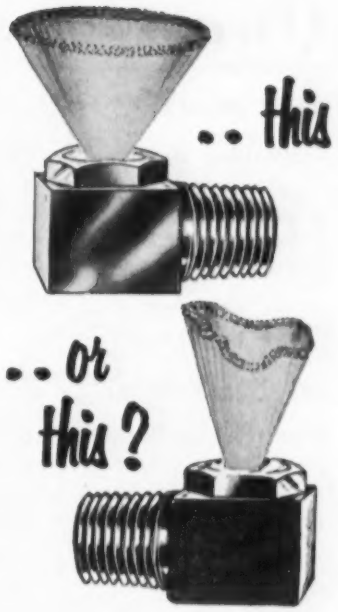
A large amount of high-conversion syrup is utilized in gum work with satisfactory results. This has been aided by the development of high-setting, thin boiling starches. More effective drying conditions must be practiced, especially if the syrup-to-sucrose ratio is above 1:1.

When a chewy, firm texture is desired, high-conversion syrup is not recommended, because it yields a tender and 'shorter' piece. This fact should be considered in making certain types of nougats and caramels. Lower viscosity or "body" of these syrups is responsible. When these candies are individually wrapped, sticking to the paper may occur.

So-called high-sucrose creams should be made with regular corn syrup.

For coverage of other papers presented at the conference of the Pennsylvania Manufacturing Confectioners' Assn., see the article, "Candymakers Gage New Methods" (FE July, p. 56).

End *(Resume reading on page 107)*



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Questions & Answers

THIS MONTH'S PROBLEM

Controlling Density

Question—We'd like to work out a simple, foolproof system for controlling density of starch slurry going into a continuous cooker. We want to feed a slurry of constant solids content to achieve uniform cooking. Have you or your readers suggestions?

SEPTEMBER PROBLEM

Preparing Deviled Crabs

Question was—In the Nov. 1954 issue of FOOD ENGINEERING (p. 99), you had an article on a frozen deviled crab operation. However, in it, there were no directions for making this product. Will you, therefore, furnish me with formula and directions for manufacturing pre-cooked deviled crabs that are to be packaged in consumer-size cartons and then frozen?

Answer—We do not, of course, have the manufacturer's formula for making deviled crabs nor for his patented, edible crab-shaped pastry shells.

Nevertheless, here's a formula for making deviled crabs that can be formed into crab shaped portions to be packed two 4-oz. portions to a carton:

Flaked, cartilage-free crab meat, 42.04%; chopped onions, 2.20%; chopped green peppers, 1.10%; butter or margarine, 1.32%; salt, 0.22%; prepared mustard, 0.48%; white sauce mix, 9.98%; water, 31.76%; chopped chives, 0.67%; egg yolks, 4.99%; cream, 5.34%; chopped parsley, 0.67%; and Worcestershire sauce, 0.13%.

Cook onions, green peppers, butter, and seasonings in steam-jacketed kettle until vegetables are tender. Then gradually add white sauce mix to water in jacketed kettle and cook until thick.

Sauce mix is prepared by blending into a bowl until crumbly: All-purpose flour, 17.64%; butter or margarine, 35.28%; non-fat milk solids, 44.10%; and salt, 3.08%. Pack mix in container, cover, and keep under refrigeration until ready to use.

Add egg yolks beaten with cream to hot, thick white sauce, with constant agitation. Next, introduce chives, Worcestershire sauce, and parsley. Then add to the sauce the cooked onions, pepper, butter, and seasonings. Finally, add the crab meat.

Form into 4-oz. crab-shaped portions, cover with buttered crumbs, and bake the items 25 min. in 350-F. oven.

In trying out this formula, you may later wish to modify the proportions of the above-listed ingredients or add additional ingredients like white pepper or Cayenne pepper.

Too, for convenience, you may wish to substitute egg yolk solids for fresh yolks and use dehydrated onions, pepper, parsley, and chives for the fresh ones.

How Would You Do It?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise.) We pay space rates.

What is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

Smoking Hams

Question—What is the recommended smokehouse procedure for ready-to-eat smoked hams?

Answer—To the best of our knowledge, there is no set method for smoking ready-to-eat hams. Since these hams are sometimes eaten without further cooking, they should be heated to an internal temperature not lower than 140 F. to destroy trichina.

As a safeguard, lower limit of internal temperature should be about 150 F., although some packers go as high as 165 F.

In smoking, make sure you increase the internal temperature above 105 F. as quickly as possible to avoid detrimental effects. To do this, smokehouse should be hot when hams go into it. And there should be a minimum spread of 30 F. between smokehouse and internal temperature of ham until maximum internal temperature (150-165 F.) is reached.

Smoking to internal temperature above 150 F. should take at least 18 hr.

Then remove smoked hams from smokehouse as fast as possible to avoid excessive shrinkage. But make sure you don't take out over- or under-smoked hams, because all of them don't finish at the same time. You might want to leave the hams in the smokehouse until cool. This way, you'll get a firmer and darker ham.

Don't hang smoked hams in too cool or humid a room, otherwise they'll lose color. Stored in too warm a room, smoked hams will not be as firm as in a cooler room. Best temperature is about 65 F.

Preparing Pot Pies

Question—We manufacture a line of packaged, frozen specialty items sold in low temperature refrigerated display cases. To increase our line, we'd like directions for making frozen chicken and turkey pot pies. Can you assist us?

Answer—Boil 11¼ lb. of chick soup base (FE, Mar., '54, p. 184) in 60 gal. of water. Cook chicken or turkey in soup base broth until done (meat strips off easily from bones).

Separately prepare a fricasse sauce by blending in a steam-jacketed kettle with low heat 2.80 gal. of chicken fat or shortening and 22.50 qt. of flour in 22.50 gal. of chicken base broth. Whip batch with wire beater until smooth and season to taste with salt and pepper.

Now introduce into batch 97.50 lb. of cooked, diced chicken or turkey meat, 45 lb. of peas, 50 lb. of carrots (diced), 25 lb. of potatoes (cooked or diced).

Add to individual aluminum pie pans, cover with pie dough, pack into printed cartons, and freeze.

Remaining chicken base broth can be used to prepare other batches of fricassee sauce.

Q.—We are installing a water filtration system in our plant and would like to know if the sand filter should precede the activated carbon filter.

A.—Yes, install the sand filter ahead of the activated carbon filter so that it will remove foreign matter before it reaches and clogs up the carbon unit.

Difficulty With Smooth Product

Question—We use a Case homogenizer for mayonnaise and have difficulty obtaining a smooth-textured product. Air is incorporated in the mix and, although smooth when freshly made, it is necessary to stir to smooth out after it "sets up." Is it possible that worn pump parts might cause this?

Answer—If pump parts are appreciably worn, we would expect you to detect a noticeable drop in pump pressure.

First, why don't you install a pressure gage between the pump and

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homogenizer and check the pressure? If low, then it would be well to tear down the pump and "mike" the parts, comparing them with the manufacturer's dimensions as shown on blueprints.

Homogenizers or colloid mills depend for their efficiency, upon maintenance of very close clearances, and any worn parts should certainly be replaced for best results.

You imply that the condition you report occurred recently, and that the equipment you are now using did, at one time, give satisfactory results. Nevertheless, it is possible that the changed conditions may lie, not in the equipment, but in the formula or some little processing detail that may have been changed without full appreciation of its effect upon the finished product's consistency.

If you keep production records and log books that will permit it, we would suggest a careful review of all known changes to see whether the undesirable condition can be related to any of them.

One factor considered of major importance by some mayonnaise makers is keeping the vegetable oil at a proper low temperature. If it is not under careful control, you might encounter some difficulty in warm-weather production.

Another possible cause might be incomplete pre-mixing before final homogenization. We understand that very good results in pre-mixing have been achieved by the use of a simple "twin disk" mixer originally developed for cake batters.

Q.–Is there a continuous method of manufacturing Boston baked beans?

A.–To the best of our knowledge there isn't. However, there is no reason why a continuous method couldn't be devised. This is merely a suggestion. But why can't you look into the possibility of conveying your overnight soaked beans (along with its components) under infra-red lamps? Perhaps one of the companies supplying these lamps may have previously been faced with this problem. If so, then you've got a good start.

Herring Formula

Question—Do you have directions for packing herring in wine sauce?

Answer—Cut vinegar-salt-cured herring into pieces of suitable size. Rinse in fresh water, drain, and pack into glass jars along with a slice of lemon, bay leaves, and chili peppers. Fill jars with wine sauce, and seal.

Wine sauce is prepared by pouring into covered kettle vat 1¼ gal. of Burgundy-type red wine, 2½ qt. of distilled white vinegar.

Then add to this kettle: Sugar, 12½ oz.; chopped onion, 1¼ lb.; whole cloves, 1¼ oz.; chili peppers, 1¼ oz.; mustard seed, 1¼ oz.; whole allspice, 1¼ oz.; whole white peppers, ⅜ oz.; bay leaves, ⅜ oz.; whole black peppers, ⅜ oz.; ground nutmeg ⅛ oz.; crushed cardamom, ⅛ oz.; cracked ginger, ⅛ oz.; and cracked cinnamon, ⅛ oz.

Immerse kettle for 2 hr. in boiling water. Then allow kettle to stand overnight, and strain to remove spices.

Barbecued Meat Balls

Question—In the Sept. 1955 issue of FOOD ENGINEERING (p. 191), your magazine had instructions on making baked meat balls. I, too, like the food-plant chef that submitted the question, operate a not-too-large food cafeteria. Baked meat balls, prepared according to your directions, made a hit in our cafeteria. As a result, I'd like to see how barbecued meat balls will go over. Do you have a formula?

Answer—There are two basic steps to making barbecued meat balls—preparing the meat balls and then the sauce.

Meat balls are made by mixing:

Ground beef, 24 lb.; bread crumbs (soft), 3¾ lb.; non-fat milk solids, 3 lb.; well-beaten whole eggs, 2¼ lb.; onions (diced), ¾ lb.; green peppers (chopped), 1 lb.; salt, 2¼ oz.; pepper (ground), ¾ oz.; and monosodium glutamate, 4½ oz.

Form meat mixture into balls with No. 24 ice cream scoop, put balls in shallow pans, bake 1 hr. at 325 F.

Now to make the sauce:

Thoroughly mix—Sliced lemons, ¾ lb.; onions (chopped), 3 lb.; chili powder, 1½ oz.; celery seed, 3 oz.; brown sugar, 18 oz.; Worcestershire sauce, 2 oz.; water, 1 gal. and 1 pt.; catsup, 1 gal.; and tabasco sauce, ½ oz.

Pour sauce over meat balls and bake additional 20 min. at 325 F., basting occasionally.

More on Pumping Problem

Re delicate pumping problem that appeared in FOOD ENGINEERING (Aug. '55, p. 169). Person who submitted the question might be interested in looking into the possibility of using a Moyno pump, manufactured by Robbins & Myers, Inc. Because this pump has no valves, vanes, or other devices to create churning and turbulence, it can handle many food materials without mushing them. It is being successfully employed to pump such hard-to-handle items as oysters, fruits, potato salad, and chow mein.—*The Editors.*

Enriching Pre-Cooked Rice

Question — We are studying the possibility of producing a pre-cooked rice. Is there a practical way of fortifying such a product with vitamins?

Answer–As pre-cooking reduces the amount of water-soluble vitamins in rice, it is logical to add a sufficient quantity of these naturally occurring vitamins to restore the original nutritive value. However, incorporation of water-soluble vitamins in a uniform manner in or on a product of separate particles like rice does present a physical problem.

We assume that you intend to dry the pre-cooked product–possibly in some sort of tunnel dryer using a travelling belt. If so, the product, as discharged from the dryer, presumably will be of reasonably constant and pre-determined moisture content. Furthermore, depth of the rice piled on the dryer belt at this point will also be fairly uniform. We would, therefore, consider that this might be a suitable place to add the desired supplementary vitamins.

Since you are primarily concerned with restoration of original water-soluble vitamins lost in processing, you might make up a carefully formulated water solution of these vitamins and add it, in controlled amount, to the dried rice. Naturally, you will not want to add any more moisture than necessary, considering that the product has just been dried. For careful control and maximum uniformity of distribution throughout the mass, the solution could be sprayed through a battery of evenly-spaced atomizing-type nozzles under a constant pressure head.

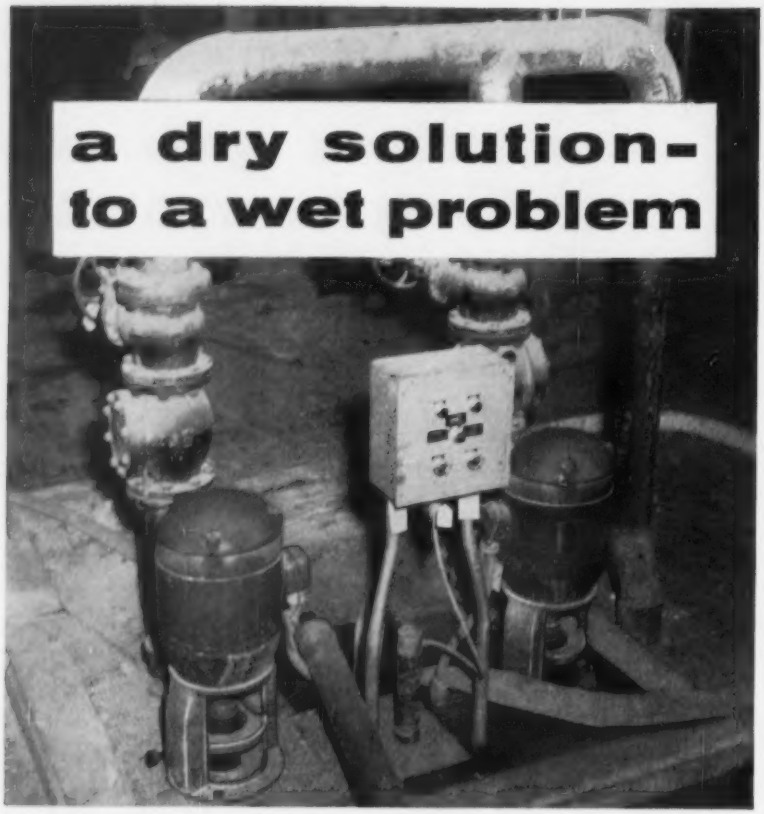
By analysis of rice before and after your pre-cooking process, you can determine the milligrams of various vitamins that it is desirable to add per pound of dried rice. Then you will have to work out a suitable combination of solution concentration and spraying rate, which will result in the calculated amount of vitamins being restored to each pound of rice coming from the dryer.

It would be worthwhile to carefully study the spray-nozzle catalogs in selecting this key portion of the enrich-

Q.–Is there such a product as banana jam? If so, how can we make it?

A.–We haven't known of such jam being retailed. However, it has been sold in bulk for the bakery trade.

To make it, cook to 230 deg. F. 50 lb. of sugar, 2½ gal. of water, and 3 oz. of cream of tartar. Then add ¾ gal. of lemon juice and 50 lb. of banana pulp (ripe). Boil to 224 deg.



A large-volume user of water had a "wet plant problem." The solution is pictured above. Here you see two Deming Vertical Sump Pumps each with a 10 HP motor. Each pump has a rated capacity of 500 GPM with a 50-foot head. Unwanted water from all areas of the plant drains into a pit. When water in the pit rises to a predetermined level, one of the Deming Sump Pumps goes into action automatically. Or, if required, both pumps can be used simultaneously. If you have a "wet plant problem" there's a Deming Distributor near you to help you solve it.

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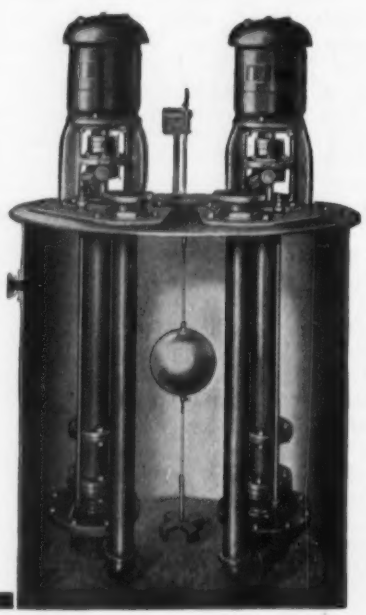

ing system. The spray patterns, for example, must be known under the selected pressure head in order to work out the proper number and spacing of nozzles for complete coverage. The volume delivered by each nozzle per unit of time under this pressure head must also be known. You may well have to do some trial-and-error calculating before arriving at the style, number, and spacing of nozzles that will deliver the right amount of vitamin solution per pound of rice without too much water.

It will help to maintain uniformity if you can readily check the flow of vitamin solution at will. A variable orifice visible-flow meter, or a recording flow meter, in the vitamin solution line will facilitate control. Constant pressure can, of course, be maintained in various ways, of which a constant gravity head using an overflow weir or pipe is possibly the simplest.

Trapping Metal Pieces

Question—One of the products we package is a dry granular material that is handled through hoppers, bins, and chutes, chiefly by gravity flow. Occasionally, we find small metal particles in the finished product—usually fine pieces of wire from sifter screens or cleaning brushes. What can be done to protect the product from such contamination?

Answer—Particles such as you mention are most likely magnetic, since it is common practice to handle products of the sort you have described in steel equipment. We suggest that you consider installing suitable magnets just ahead of your packaging equipment. Then make a very careful study of them to observe what foreign matter they trap.

Just what will constitute the best type of magnet for your particular conditions may require consultation with manufacturers of magnetic protective devices. Today's permanent magnets retain their strength for a great many years and offer the advantage over electromagnets in that there is never any interruption in their efficiency through power failure or human errors in neglecting to turn on the current.

The magnet might take one of sev-

Q.—Can you advise us on how to avoid tough skins on syrup-packed, canned Damson plums?

A.—We believe toughening of the skins is attributed to calcium salts in your blanching water. If this is so, then add 0.1-2.0% sodium hexametaphosphate to the syrup.

eral forms. A plate magnet would be the simplest. However, it would probably be best to construct a sort of trap or "hump" in your chute for installing such a plate in order to make sure of maximum contact with the magnet and minimum rubbing off of any metal collected.

Perhaps a better installation would be a magnetic grate, composed of magnetic bars which can be set directly into one of your chutes. These come in standard sizes and take up very little space.

If your flow includes belt conveying of the product, it is, of course, then possible to use a magnetic pulley, which will attract the contaminant as the powder travels over the pulley.

Then there is the hopper type of magnet consisting of an assembly of discs, somewhat like a farm disc harrow. When this is placed in a hopper, the dry materials runs between the discs, and the metal is retained. Of the several styles suggested, this would appear to be the one most likely to prove suitable.

Repairing Mortar Joints

Question—We thought our floor problems were solved when we put in a brick tile floor, but now find that the mortar joints have deteriorated and must be repaired. Can you tell us how to repair these joints?

Answer—Here's the procedure recommended by one of the major manufacturers of mortar:

First, clean the floor by your normal procedures, and then chisel out all soft or corroded mortar from the joints. Next, soak the floor and joints about half an hour with 10% muriatic acid, following with thorough water flushing. Remove excess water.

Now prepare your mortar of consistency that can be slushed into the joints. With broom or squeegee, work mortar back and forth over the joints until all crevices have been filled.

We have heard of using a rotary powered floor cleaning machine for this step, especially where there is a great deal of area to cover, or where the repairs must frequently be done.

Dust dry cement or mortar mix over the surface, and work it back and forth to absorb excess moisture, dis-

Q.–We've run into something unusual: Fried pies from the same batch are soggy while others are not. Where's the trouble?

A.–Seems like it's in your cooling operation. You are probably stacking the pies so that moisture from them condenses on the crust.

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carding when it becomes wet. Wipe off surplus mortar with burlap, but be careful not to pull out new mortar.

Perform final cleaning after mortar hardens, and remove any remaining mortar stains with 10% muriatic acid wash applied to wet floor, and thoroughly flush off with water.

The foregoing instructions apply to ordinary repairs for average usage. If you have such severe operating conditions that the mortar must be frequently replaced, or if there is a chance that deterioration has extended to the sub-base beneath the file, then we recommend that you consult an experienced floor contractor about acidp oof materials to preserve the life of the floor.

Making Potato Soup

Question—Do you have a formula and directions for processing cream style potato soup in No. 1 cans?

Answer—Into a steam-jacketed kettle, add: Diced, 5-min. blanched potatoes, 26¼ lb.; soup stock, 87½ lb.; salt, 3½ lb.; butter or margarine, 8¾ lb.; and white pepper, 3½ oz.

Slowly boil batch for 10 min., and then add a paste made up with 5¼ lb. of wheat flour. Boil an additional 5 min., fill into No. 1 cans, exhaust 3 min., retort for 35 min. at 250 F.

Soup stock, of course, is prepared by slowly simmering (not boiling) in a steam-jacketed kettle for about 10 hr. 250 lb. of bony beef in 50 gal. of water. The bones of the beef—head neck or shin—should be cracked

New Curd Meter

—*Continued from page 98*

and curd, then a slow approach to the critical temperature as indicated by an initial curd reading of 10.

As soon as the reading of 10 was obtained, cold water was to be applied to the jacket to lower the temperature to that of the cheese, then the whey was to be drained, usually in 15 min.

Fig. 3 demonstrates that, by this method of control, it is possible to obtain uniformity of "cook" and curd, and to finish with a cheese that will show a final meter reading of 6. Critical temperature for the vats was about 119 F., an average of 4 deg. lower than was formerly used.

Fig. 4 shows the correct steps to follow in cooking a large vat of cheese.

There are exceptions to the above method, however. Fig. 5 shows results of an experiment with curd containing 6.2% fat. The critical temperature is increased and, although

the final cheese had exactly the same firmness as a fat-free curd, it did not conform exactly in degree of shrinkage. This is also the case if pasteurizing temperature of skim milk is too high.

Another exception is the cooking of cheeses from low-heat powders. Fig. 6 shows how easy such a cheese can be undercooked, since the feel of the curd is different from that of ordinary curd.

From previous knowledge of the powder it could be predicted that the critical temperature of cooking would be in the neighborhood of 130 F. The meter reading gave a temperature of 134, and the cheese finished out very nicely with a reading of 6.

In some markets a softer cheese is preferred and in others a firm of even slightly rubbery curd is more acceptable. In order to establish the meter readings at which the whey should be drawn, the following suggestions are offered:

1. Measure the firmness of finished cottage cheese that seems to meet the market demand.

2. Add 4 deg. to this value in order to establish the reading at which the whey should be drawn.

The author of the above article wishes to express grateful acknowledgment for the cooperation of Dr. Arthur C. Fay, director of research of H. P. Hood & Sons, Boston.

End (Resume reading on page 99)

Sources of Radiation

—*Continued from page 108*

would be reduced by the water, and the irradiation delivered might prove to be of doubtful intensity.

2. Designing a heterogeneous reactor. With it can be used a coolant which, as it passes through the reactor, becomes radioactive with a short half-life.

Such a plan, utilizing a liquid sodium or sodium-potassium amalgam as coolant, has been drafted by North American Aviation Co.

3. Building a water-cooled heterogeneous reactor. There might be dissolved in the water a salt, one of whose ions have a high cross-section for neutron activation to form a gamma emitter with a short half-life. Manganous salts offer a possibility.

4. Constructing a homogeneous reactor with its fissionable material in solution so that the fuel solution may be circulated through pipes in a volume to be used as the irradiation facility. Here, neutron shielding must be considered, since about 0.2% of all neutrons liberated as a result of fission are delayed types with an emission half-life of over 20 sec.

Such a design is being incorporated in the reactor under construction by Gamma Corp., Mansfield, Mass.

5 Devising a homogeneous reactor with some of the circulating fluid being tapped at intervals to permit chemical extraction of very active fission products. This procedure would probably have to be done several times a day to get the greatest amount of activity.

6. Developing a water-boiler reactor so that the gaseous fission products may be piped off and pumped through coils or plates in the irradiation area. About one-third of the active fission products are in gaseous form (xenon, krypton, and iodine vapors) 10 sec. after fission. Since the active isotopes have half-lives in the 7 to 17 sec. range, these gases must be rapidly removed from the reactor core if they are to be of use.

This idea is being incorporated in the reactor being built at the Armour Research Foundation of Illinois Institute of Technology, Chicago.

7. Utilizing the N^{16} which is produced by the (neutron-proton) reaction of neutrons in the reactor with the O^{16} present in the water coolant. The nitrogen form has a half-life of about 7½ sec. and emits a beta particle accompanied by very penetrating gamma rays as its decays back to the oxygen form.

Such a source would require rapid removal of the nitrogen gas to the radiation facility, and a method whereby the free hydrogen and oxygen are safely recombined into water. This particular problem has apparently been solved by reactor designers.

What's Ahead

Further gamma sources may become available if the active fission products of reactors can be isolated or concentrated into the forms desired.

A chemical separation plant is now being built at Oak Ridge, and it should be able to deliver some sources of desired characteristics within two years.

In addition, there is always the possibility that some day our military atomic needs will have been satisfied with sufficient quantities of fissionable isotopes of the transuranic elements. Then some of the production reactors of AEC might be used to produce abundant amounts of cobalt 60 for sources.

A project to produce megacurie amounts of cobalt 60 in production reactors has been suggested by Bernard Manowitz of Brookhaven National Laboratory.

End (Resume reading on page 111)

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Useful New Books & Government Publications

New AOAC Manual

OFFICIAL METHODS OF ANALYSIS OF THE ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS (*Eighth Edition*) *Edited by William Horwitz. Published by Assn. of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington 4, D. C., 1955. 1008 pages. 6½ x 9½ in., cloth. Price:* $12.

Revised at five year intervals since 1920, this work reveals a distinct simplification in methods, due in part to developments in instrumental technique and the uses of such processes as chromatography.

The food processor will be greatly interested in much of the contents, which includes chapters on dairy products, eggs and egg products, coffee and tea, cereal foods, cacao, enzymes, fish, meats, nuts, waters, sugar, and beverages of all kinds. Additional data is offered on pesticides, coloring materials, enzymes, oils, fats, and waxes.

Much outdated material has been deleted and replaced by current methods, all discussed in detail. Most important, perhaps, is an entirely new chapter on spectrographic methods. Chemical methods now include such things as determination of α-amylase in malt. The section on nutritional adjuncts now includes discussions of such important topics as amino acids and antibiotics.

Safety From Scraps

SAFETY DEVICES & IDEAS. *Book I and II Published by National Safety Council, 425 N. Michigan Ave., Chicago 11, 1955. 48 pages (each). 8½ x 11 in., paper. Price:* $1.25 (*each book*).

Want to make a broken bulb extractor? Need a switch lockout? These clearly illustrated books demonstrate how to make these and many other devices designed to prevent and control accidents.

Plant managers will find dozens of useful ideas in the books, most of them requiring only scrap materials. All ideas are tested and have proven practical.

Plant Maintenance Report

TECHNIQUES OF PLANT MAINTENANCE AND ENGINEERING—1955. *Published by Clapp & Poliak, Inc., 341 Madison Ave., New York City 17. 1955. 218 pages. 8½ x 11 in., cloth. Price:* $7.50.

A report of the proceedings of the annual conference held at the Plant Maintenance and Engineering Show, work is a complete and up-to-date guide to problems of plant maintenance and engineering. Highlight is the text of over 1,000 questions presented to 56 experts at the conference, the answers to which offer practical and workable advice.

Twenty-three papers are included in their entirety, as well as the questions which followed. Sixteen round-table discussions are summarized. The food industry is one of five topics which drew special attention.

Electrical Circuits Guide

ELECTRO-TECHNOLOGY *By M. G. Say. Published by the Philosophical Library, Inc., 15 E. 40th St., New York City 16. 1955. 167 pages. 5½x8¾ in., cloth. Price:* $6.

The book offers basic theory and circuit calculations for electrical engineers.

First part deals with conduction, and electric and magnetic field effects, along with a glossary. Second part covers the handling of circuit problems. Both two-terminal and four-terminal cases are dealt with, along with unbalanced and balanced three-phase circuits.

A collection of network theorems is of great interest to those who have to work out electrical qualities in all types of circuits and networks.

Pests vs. Public Health

HEALTH ASPECTS OF PEST CONTROL *Published by School of Public Health, University of Michigan, Ann Arbor, Mich. 1955. 49 pages. 8½ x 11 in., paper. Price:* $2.

A collection of manuscripts presented at the Inservice Training Course for Pest Control Operators, the book is of particular interest to plant sanitarians.

It covers a wide range of subjects from habits of insects and rodents to oils in chemical insecticides. All are approached from the standpoint of public health and its relationship to pest control.

Tips on Process Savings

PROCESS ENGINEERING ECONOMICS *By Herbert E. Schweyer. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1955. 409 pages. 6 x 9¼ in., cloth. Price:* $7.50.

A source of ideas for savings in design and operation, this book can serve as a ready reference for the food engineer. Simply written and covering all of the major processing industries, in-

FE REPRINTS AVAILABLE

Listed below are special sections, flowsheet book, and articles from past issues of FOOD ENGINEERING which are available in reprint form. Single-copy prices are listed. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon, inside the back cover. You will be billed when your order is filled.

1. Meat Special $1.25

Contains a series of 9 articles: (1) Cold Sterilization Problems. (2) New Continuous Lard Process. (3) Progress in Meat Dehydration. (4) High-Speed Chub Packaging. (5) Atomic Irradiator Designed. (6) Improvements in Unit Tasks. (7) New Processes for Old Products. (8) Map Unravels Delivery Snags. (9) Saves 50% of Retort Steam.

2. Dairy Special $1.25

Ten timely articles are included: (1) Dairymen Face Challenging Changes. (2) New Processes for Instant Dry Milk. (3) Controls Presage Automatic Dairy. (4) Save With Cleaned-In-Place Pipes. (5) Bi-Oxidation Solves Waste Problem. (6) Cheese Keeps in Antimycotic Wrap. (7) Plastic Tank for Milk Trailers. (8) Bulk Handling Aids Processors, Too. (9) Advanced Dry Milk Flowsheet. (10) "Tracers" Detect Foreign Fats.

3. Ingredient Special $1.25

Ten articles helpful in improving product formulation: (1) Chemicals Still a Question. (2) Role of Antioxidants. (3) MSG —Unique Enhancer. (4) Tailored Salts Add Values. (5) Ascorbic Acid Betters Meats. (6) Dry Solubles Are Versatile. (7) Sugar Types and Uses. (8) Latest on Low Calories. (9) True-Fruit Hows and Whys. (10) Stepping Up Nutrition.

4. Packaging Special $1.25

Six articles of practical value: (1) Flexibles Are Revamping Packaging Pattern. (2) How To Avoid Damage in Shipping. (3) Bundling Frozen Foods. (4) One-Portion Packets. (5) Automatic Packaging Line. (6) Paper Vs. Glass.

5. Canning Special $1.25

Eight articles on significant developments: (1) High Frequency Looms as Improved Cooking Method. (2) New Twist in High-Short Retorting. (3) Full-Flavor Concentrates by New Recovery Technique. (4) From Orchard to Cannery—Under Water. (5) At Gerber's Quality Control Reigns Supreme. (6) Bulk Brining Spells Big Benefits to Canner. (7) Top-Notch Tomato Processing Operation. (8) Dual Tomato Cannery—How It Ticks.

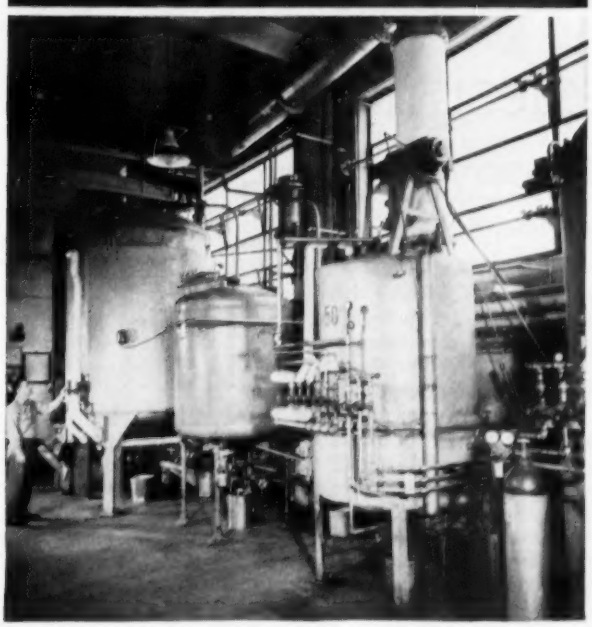
6. Book of Flowsheets $2.00

Few copies of 1949 edition still available. It contains 130 process charts covering a wide variety of food manufacturing operations. Charts are accompanied by brief descriptions of the processes.

7. Preventive Maintenance $0.50

An 8-pager packed with information that will help to minimize costs, reduce down-time, and promote quality through more effective maintenance.

Why OLEORESINS?



Top: Grinding Room where spices of selected grades are reduced to proper particle size for extraction.

Bottom: Oleoresins are extracted under watchful supervision in this 3-unit, 8000 lb. extractor at our Clifton Factory.

BECAUSE they are unmatched for fidelity of flavor, uniformity, economy and convenience of handling.

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GINGER NF ALCOHOLIC EXTRACTION	SAGE
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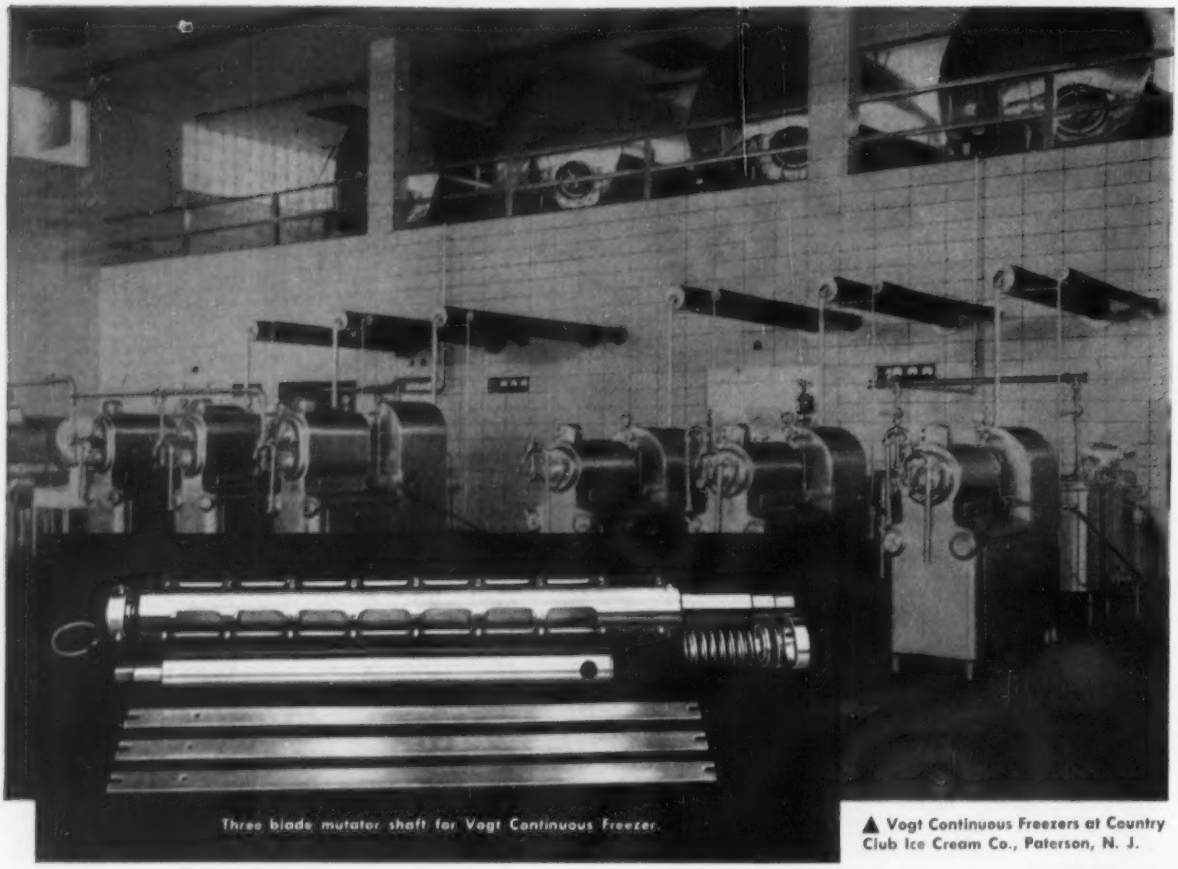

Three blade mutator shaft for Vogt Continuous Freezer.

▲ Vogt Continuous Freezers at Country Club Ice Cream Co., Paterson, N. J.

How stainless meets design requirements for intricate freezer parts

Resistance to the corrosive attack of strong cleaning solutions . . . and freedom from product contamination are but part of the reason why the scraper blades in these Vogt Freezers are made of stainless steel. Besides this requirement, the blades must be of the right hardness to take and hold a keen edge.

In their search for a material possessing both of these properties, the Cherry-Burrell Corporation, manufacturers of these continuous ice cream freezers, tried Crucible stainless steel, type 410. This straight-chromium grade has proved to be the most satisfactory material for this use. For 410 type stainless not only fights corrosion satisfactorily, but never harms the flavor or quality of the delicate dairy products it touches. And its high hardness and toughness mean that the scraper blades hold a sharp edge longer and require less frequent sharpening.

The rest of the freezer is made of stainless steel, too — because stainless is so easy to clean . . . and its attractive, bright finish makes a good impression on plant visitors.

Whether your product is ice cream, frozen fruit juice, meat, or *any* food — there's a grade of Crucible stainless steel that's just right for your equipment. Ask your Crucible representative for full details. And, if you'd like to have complimentary copies of the handbooks on the uses of stainless in your specific field, find the ones you want in the *Crucible Publication Catalog*. To get it, just write *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

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cluding food, the work details the practical use of cost data in evaluating the economic feasability of processes. A combination of theory and practice underlies the discussion.

Featured in the text is a condensation of principles not included in any other separate volume, and up-to-date material from current books. New material on economic balance for chemical reactions is included.

Tech-Spelling Guide

TECHNICAL SPELLER *Compiled by Gessner G. Hawley and Alice W. Hawley. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22, 1955. 146 pages. 5¼ x 7¼ in., cloth. Price:* $2.95.

Of particular value to members of the food industry concerned with technical reports and correspondence, the book lists over 8,000 words in the chemical, engineering, metallurgical, electronic, medical, and physical fields. The handy manual is a quick, convenient guide to technical spelling.

Booklets & Reports

ACCIDENT FACTS. *Published by National Safety Council, Chicago 11. 96 pages, paper. Price:* $.75. 1955 edition deals with statistics and facts on all types of accidents.

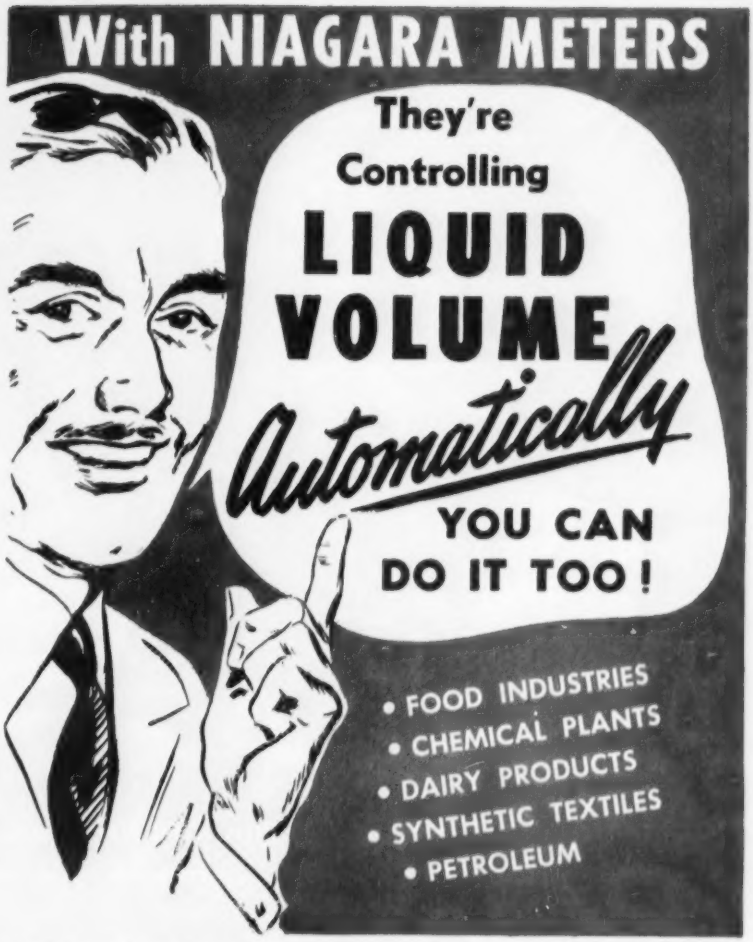
METHODS, EQUIPMENT, AND FACILITIES FOR RECEIVING, RIPENING, AND PACKING BANANAS. *(Marketing Report No. 92) Published by USDA, Washington, D. C. 127 pages, paper. Price:* $.65. Illustrated manual.

MEETING PRODUCTION'S MANPOWER NEEDS. *(No. 219 in Manufacturing Series) Published by American Management Assn., New York City 36. 39 pages, paper. Price:* $1.75 ($1.25 *to members*). Manhour utilization and management development.

MANUFACTURER AND DISTRIBUTOR BRANDS. *(Bulletin No. 80) Published by University of Illinois, Urbana, Ill. 103 pages, paper. Price:* $1. Brand policies and problems, price and quality comparisons, and consumer study.

CURRENT PRACTICE IN THE DEVELOPMENT OF MANAGEMENT PERSONNEL. *(Research Report No. 26). Published by American Management Assn., New York City 36. 35 pages, paper. Price:* $1.75 ($1.25 *to members*). Preparing staff for management responsibilities.

UNITED STATES GOVERNMENT ORGANIZATION MANUAL. *Published by Government Printing Office, Washington 25, D. C. Paper. Price:* $1. Guide to authority, organization, and function.



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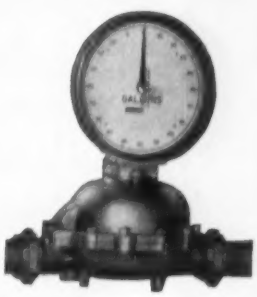

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KEEPING UP WITH THE FIELD

• Economic Trends • Labor DevelopmentsTechnical News • Washington Highlights

Finds Rayed-Food Tell-Tale

Sterilizing point for thousands of batches of radiated food can now be judged accurately at a cost of only one cent.

Dr. E. J. Henley, Columbia U., developed the money-saving idea by discovering that ordinary blue cellophane changes color when exposed to gamma rays. The bigger the dose, the more the color fades.

Processing can thus be stopped when dime-sized pieces of film, attached to cans and packages, reach a pre-calculated shade.

Dr. Henley says 20,000 of the miniature dosimeters can be cut from a penny's worth of cellophane.

New Low-Cost Fish Press

A new spiral, fish meal press, developed by Norwegian engineers, has many advantages over present screw-type units, reports Fish & Wildlife Service.

In fact, this latest press takes only ⅓ the space of conventional machines and costs up to $6,300 less. And, because it squeezes out more oil, resultant fish meal has higher quality, says F & WS.

Machine is made by A/S Myrens Verksted, Olso, in two models that rate at 300 and 100 tons per 24 hr.

Mesh Cuts Sugar Spray

A new device keeps boiling sugar solution from spraying out of the evaporator into condenser water (which results in lower yields) at Hawaiian Commercial & Sugar Co., Maui, Hawaii.

The invention, developed by Honolulu Iron Works Co., consists of a stainless steel mesh, sandwiched between steel frames. Unit installs in evaporator and is self-cleaned by condensed vapors from rising steam.

U-V Sterilizing of Water

Contaminated water can now be practically and economically sterilized by ultraviolet radiations of bactericidal lamps, reports Dr. R. Nagy, of Westinghouse's lamp division.

Average raw water may be made potable, he said, at up to 750 gal. an hour in treatment with a 40w. unit.

Bakers Meet Problems 'Head On' At Big Progress Convention

E. E. Kelley, Jr.
Prexy sets theme

"The New Horizons" in processing and equipment were graphically drawn for over 13,000 visitors at the recent Baking Exposition in Atlantic City.

The show was sponsored jointly by American Bakers Assn. and Bakery Equipment Manufacturers Assn.

Convention theme was set by ABA president E. E. Kelley, Jr., who stressed importance of problems still to be solved—such as labor costs, fair trade practices, and general nutrition education.

On the later, he declared that bakers must sell their food-value story to combat misinformation spread by quacks and food faddists.

Here are other highlights that pointed up the forward thinking:

Sanitation: "Strides are being made in setting up a standard code for sanitary design, construction, and installation of baking equipment," stated J. L. Barron, National Biscuit Co., and chairman, Sanitary Standards Committee.

Research: "Continuous mixing, ferments, freezing, and gamma radiation will soon be common words to all bakers because of recent technical progress," hailed Martin Eisenstaedt, American Stores Co., and president, American Society of Bakery Engineers. L. E. Caster, chairman, American Institute of Baking, detailed bacteriological research and baked goods freezing studies that will soon be undertaken by his Institute.

Cost Control: "Close budgeting and emphasis on increased production volume at lower prices are answers to

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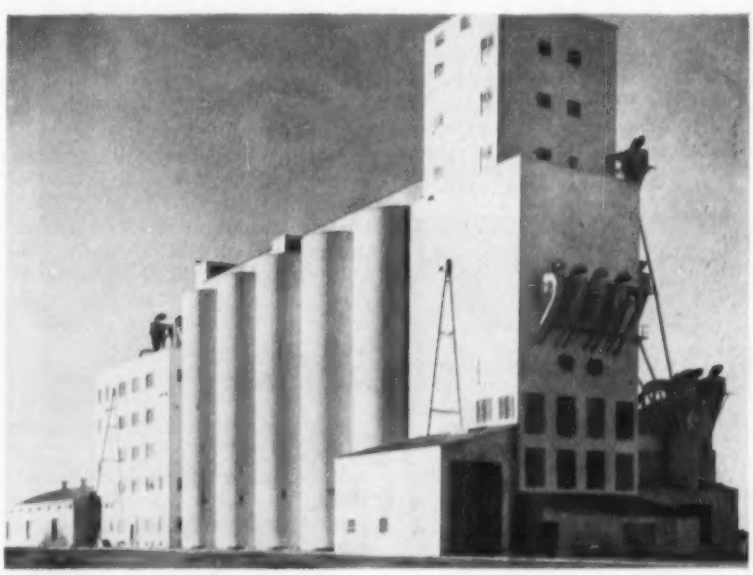

Lofty Rice Storage-Mill Opens Doors

Processing has started at the new $2,500,000 mill, dryer, and storage plant of Farmers' Rice Growers Coop. in West Sacramento, Calif. Plant has a present capacity of 500 bags of paddy rice per hour. But, equipment and power systems are designed for a future production of 600-650 bags per hr. A total of 416,000 bags can be held in 42 dryer and storage bins. Among new pieces of handling equipment used here is a 50-ton truck scale and dump that discharges rice into a large receiving pit. Air conveyors handle all hulls and bran. Designer and builder was MacDonald Engineering Co., San Francisco, Calif.

FDA Reverses Pesticide Decision, Miller-Act Group Advised Switch

FDA has now reversed its earlier decision barring use of the miticide Aramite, and has set a 1 ppm. tolerance for the product's use on 19 crops. Action was taken following a recommendation to this effect by the 5-man advisory group headed by Yale University's Dr. Harry S. N. Green—first such committee to be appointed under provisions of the Miller Pesticide Amendment.

Basically, Feeding tests showed that Aramite causes tumors at a 5,000 ppm. level, and to a lesser extent, at 1,580 ppm. Some rats fed 500 ppm. evidenced liver injury, and one animal had a small lesion. Dogs fed at these three levels showed some liver injury but no lesions. No data were presented for less than 500 ppm.

The committee recalled that though 200 ppm. concentrations of DDT produce certain cancer symptoms, that product is allowed in marketed commodities at levels up to 7 ppm.

Thus, it recommended that U. S. Rubber Co. (makers of Aramite) "Be advised to secure acceptable data" on Aramite's toxicity and carcinogenicity at levels between 0 and 500 ppm. And that the whole problem should be reviewed again in 1957 when such data are available.

"The committee does not wish to leave the impression," the report emphasizes, "That their recommendation in this case creates a precedent for inadequate experimentation. It therefore recommends to manufacturers that these substances be tested over a wide enough range of concentration *in advance of marketing* to determine positively the feeding levels at which *no injury* can be found."

As far as food men and pesticide manufacturers are concerned, the following is the most important part of the committee's statement:

"The Committee (barring a change in present cancer theories) believes it logical to use the same standards of safety for weak carcinogens (like DDT, Methoxychlor, and Aramite) as with other chemicals not shown to produce such effects—*i.e.*, the principle of 'demonstrated injury' as a criterion of toxic levels."

On this basis, comparison of data for unproven substances with that of known materials is acceptable as a reasonable assurance of safety. Concentrations below which no injury is seen are, by analogy, safe levels.

Baker's Convention (Cont'd)

rising labor and material costs," said John Thies, Quality Bakers of America Corp., Inc.

Distribution: "Labor and management should sit together to try to cut distributing bottlenecks and promote public understanding of their problems," said David Kaplan, president, Economics Distribution Foundation.

Safety: "Accidents don't happen—they are caused," argued R. A. Wiseman, Liberty Mutual Ins. Co., in accenting need for better selection and training of bakery personnel to cut accident frequency.

Labor: Concern for the ever-shortening work week was expressed by many panel members in discussing 5-day, 6-day, and swing-shift problems. "The necessity of hiring a swing-shift worker may well spell the difference between profit and loss," said T. C. Weltmer, Columbia Baking Co.

"However, a 5-day work week for all bakeries would eliminate the swing-shift—if consumers would accept the extra 'drop-out' day," declared Karl Koepplinger, Koepplinger's Bakery, Inc.

Quality: Need for better dating practices to up pie quality was pinpointed by Earl C. Johnson, Wagner Baking Corp., who said, "People would buy more pies if we could guarantee their freshness."

Product Development: "Possibilities in the field of frozen cakes are tremendous," reported Herman Dressel, Dressel Bakeries, in reviewing present studies in the new field. Dr. W. M. Urbain, Swift & Co., revealed latest developments in radiation sterilization as they applied to baking.

Delivers Hot Meals

Vending of preheated meals is now possible with unit developed by H. J. Heinz Co. and Mills Industries, Inc. Machine holds 144 portion-size cans in six varieties. Menus can be rotated from a selection of 14 lunches and 13 heavy soups. Food is delivered piping hot in original container.

Meat Plants Safer

During the last year, the accident frequency rate dropped to 12.3 per million man-hours among 200 meat slaughtering and processing plants participating in AMI's Safety Award Program. The old rate was 12.4.

The Institute's safety committee is presently working on a revised safety code for sausage manufacturing. It is believed this will further lower mishaps.

Active interest in safety by top management is cited by the committee as of first importance in accident prevention.

Win Sanitation Awards

Three food sanitarians have been cited for service to their communities at a recent annual meeting of the International Assn. of Milk & Food Sanitarians in Augusta, Ga.

B. G. Tennant, Chief Sanitarian, Escambia County Health Dept., Pensacola, Fla., won top prize, the Sanitarian's Award. Also honored, were Dr. R. G. Ross, Chief Milk Sanitarian, City-County Health Dept., Tulsa, Okla., and A. W. Fuchs, International Cooperation Admin., Jamaica, who both got Citations.

Unique 'Pre-Pack' Meats, Six New Pies Revealed

Boned and frozen meats are now being test-marketed in three cities, announces Swift & Co. Unique move is said to open up broad possibilities for the meat-packing branch.

The prepackaged items cover 15 "basic" beef, pork, and lamb products, ranging from roasts and steaks to chops and stews. Consumers eat what they buy, says the company, because all bone and excess fat have been removed. Further, roasts and steaks are panel-tested to assure uniform tenderness.

Meats are foil-wrapped and color photos picture contents. Cooking instructions and weights are printed on wrapper.

At the same time, Swift announces marketing of six new frozen pies: Beef, pork, chicken, veal, turkey, and lamb.

Soon to come, are frozen stuffed turkey, fried chicken, and giblet gravy.

Weighs Rolling Trucks

They can now weigh your trucks electronically—as they proceed down the highway. In short, the vehicles needn't be stopped to do it.

Present experimental units of new scales are located on U.S. 1 near Woodbridge, Va. They consist of narrow, free platforms set in the surface of regular highway lanes. And they automatically measure weight on each axel and spacing between axles.

The new scales, says McGraw-Hill's *Engineering News-Record*, will supply valuable information on gross highway tonnages and frequency of different axel loads—all without interrupting normal traffic flow. Only one man is required to operate the equipment.

Hors d'Oeuvres

▶ When the flood made water undrinkable in Waterbury, Conn., the local Coca-Cola company gave away more than 6,000 bottles of water purified in its plant. Each bottle was a pause that refreshed good public relations.

▶ It is appropriate that answers to questions on food and cooking won the $64,000 TV jackpot. He who doesn't eat can't use money.

▶ But the fact that a Marine captain knows so much about food raises an interesting question: Are the Marines really tough, or do they get the situation in hand quickly so they can eat?

▶ More food per capita is available almost everywhere in the world except in Communist areas, FAO reports. So the plow remains mightier than the sword.

▶ With farm income down 31% since 1947, politicians are dreaming up bigger and better farm-price props. Our officials better adopt the Russian picnic-and-banquet technique to keep our surplus warehouses from bursting.

▶ It takes only eight companies to supply the demand for canned squid. Obviously we need a National Eat A Squid Week.

▶ Catchup is packaged in roll-up tubes in Switzerland. Restaurants here serve it in plastic squeeze bottles and pump action dispensers. Looks like man may at last win his battle with the contrary condiment.

▶ Grass-growing rains brought by hurricanes Connie and Diane boosted September milk production 15% in the New York milkshed. A hurricane to some, hurrah!-cane to others.

▶ At a recent supermarket show, there were 150 non-food exhibits. Looks like the old general store is back in a new form.

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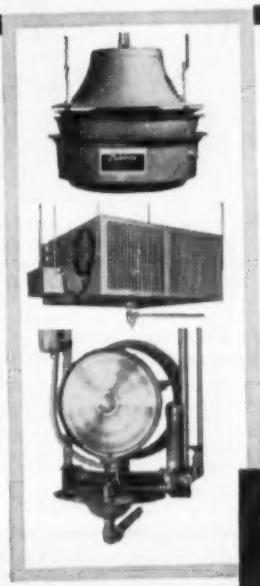

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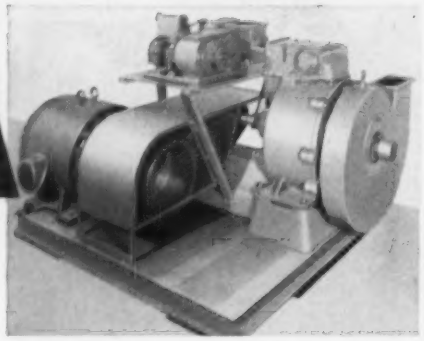
Do You Need ULTRAFINE GRINDING?

FOR UNEXCELLED QUALITY WITH CONTROLLED PARTICLE RANGE

use a SCHUTZ-O'NEILL PULVERIZER



Backed by 62 years experience!

If your product must be pulverized to ultrafine specifications and yet have controlled particle size distribution, you'll find proven Schutz-O'Neill "Superfine" Pulverizers best for the job.

Many products that are heat sensitive can be pulverized safely too, because the grinding principle of impact with air attrition keeps product temperatures down and helps control humidity.

Versatility of the Superfine Pulverizers makes them adaptable to the complete range of grinding from coarse to ultrafine. Schutz-O'Neill Superfine Pulverizers are used in the paint industry where ultrafine pigments with close particle size range are vital; by major cocoa powder, sugar, spice and pharmaceutical manufacturers; for emulsifier gums, resin, plastic and seaweed extract powders—wherever unexcelled quality grinding is required. Offered in 6 sizes ranging from 7½ to 125 HP with grinding chambers 12" to 28" in diameter.

FREE TEST GRIND OF YOUR PRODUCT in our test lab! Tell us your milling requirement—fineness, uniformity, increased output, lower cost—send us a sample of the stock you want to pulverize, state fineness and capacity desired. You'll receive back your processed product plus our Engineering Test Report—there's no obligation.

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"Convenience Is a Must" Says Mortimer, GF Head

"Key to success in our market is spelled out in one word: Convenience", asserts Charles G. Mortimer, president of General Foods Corp.

And, to achieve full value from this "super-additive", he declares, food processors must realize that consumers today expect convenience to mean these eight benefits: Product must be; (1) the right form, (2) available at all times, (3) conveniently located, (4) right size or unit quantity, (5) surrounded by the best package, and (6) ready for cooking and eating. Customers also demand; (7) a proper selection from which to choose, and (8) combination products that naturally tie together.

Mortimer stresses importance of initial product planning from the consumer end, rather than production. Further, production, marketing, and distribution cannot be separated, he states, since they are now intertwined by one common motive—keeping merchandise on the move.

Prescott Award Deadline

Final date for entries for the annual Samuel Cate Prescott Award has been set as Dec. 1, 1955.

Established by the Northeast Section of the Institute of Food Technologists to honor Dr. Prescott, the award aims to stimulate interest of young people in food technology. It carries a prize of $100 for the best written account of a research project, preferably, but not necessarily, a project conducted by the author.

USDA Teams Win Prizes For Process Advances

Superior Service Awards have been presented by USDA to two scientific teams at the Eastern Utilization Research Branch laboratory (Philadelphia) and to four groups at the Western Utilization Branch (Albany, Calif.)

Eastern teams received awards for accomplishments in the field of fruit essences and dairy wastes. The westerners were honored for research in dehydrated potatoes, dried egg solids, jelly, and beet sugar technology.

The Philadelphia group headed by R. Eskew developed an economic process for recovery of volatile fruit flavor esters—in the preserve industry.

To the second team, captained by Dr. Sam R. Hoover, went honors for research which led to development of inexpensive plants for treatment of milk processing wastes.

The Coast group led by H. S. Olcott was cited for devising improved equipment and processing that make manufacture of dehydrated mashed potatoes possible.

Further, Hans Lineweaver and an associate discovered the principle cause of deterioration in yolk and whole egg powders. And a group led by L. H. Walker was recognized for developing a commercial process that converts cull strawberries to a frozen concentrate for jelly. Finally, H. S. Owens and his colleagues were hailed for identifying non-sugar components in sugar beets.

Honored for A-Test Aid

National Assn. of Frozen Food Packers and two frozen-food scientists have received public service awards for their contributions to national defense at this year's A-bomb food tests.

Presentations were made by Val Peterson, Federal Civil Defense Administrator.

NAFFP's award was received by G. L. Mentley, president. The individual honors went to H. P. Schmitt, the Association's research director, who acted as project officer during the tests, and to K. G. Dykstra, manager of Birds Eye laboratories, who served as project consultant.

Fewer Locker Plants But More Business

In spite of a decline in their total number, frozen food locker plants have shown a gain in volume of food processed and number of customers served during the past 5 yr., says the Farmer Cooperative Service, USDA.

Latest figures show 10,553 plants as against 11,608 in the peak year of 1951. However, number of families served has risen in this period from 4,300,000 to 5,100,000—an 800,000-family increase.

Processing volume has jumped to 1,400,000,000 lb.—a sizable up of 200,000,000 lb.

Safety Kits Offered

For use in connection with the President's Safe Driving Day—December 1—The National Safety Council is making available promotion kits containing posters, stickers, displays, and buttons.

Particularly, companies with truck fleets can spread the safety theme by means of dash stickers and bumper strips.

The Council should be addressed at 425 N. Michigan Ave., Chicago, for facts on the materials.

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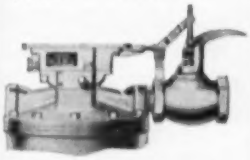

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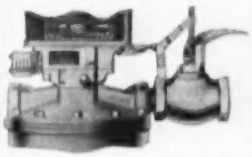

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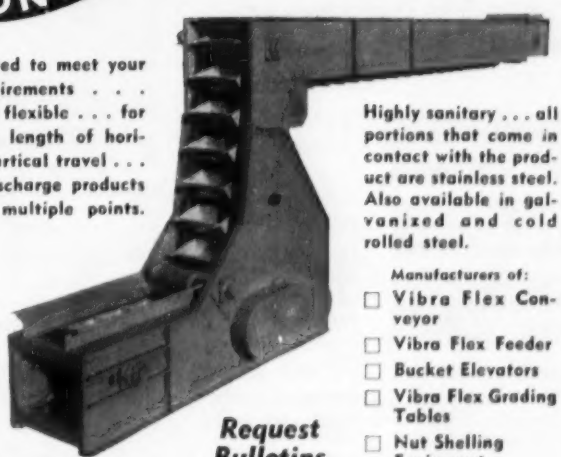

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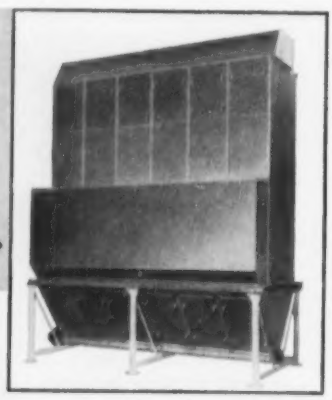

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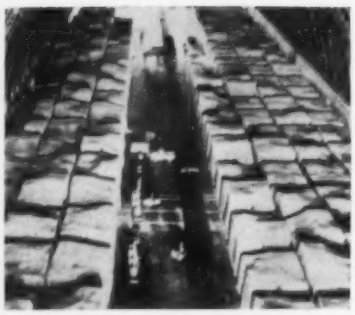


Protects Surplus Rice

Bagged rice, stored by the Commodity Credit Corp., is protected from dirt, rodents, and insects by polyethylene shrouds (Visking). These 'tarps' are held tight to the ground by 6-ft. plastic tubes filled with sand. Scene here is ex-blimp hangar at Hitchcock, Tex.

Dole Adds Mainland Plants To Widen Product Line

Hawaiian Pineapple Co. has disclosed plans to gain still further mainland fruit cannery outlets, and it hints it may put the Dole label on vegetable and other food products for the first time.

Company announces that tentative merger-agreement has been reached in negotiation with two west coast canneries, F. M. Ball & Co., Oakland, Calif., and Paulus Bros. Packing Co., Salem, Ore.

Presently owned by Hapco, is Barron-Gray Packing Co., San Jose, acquired in 1948.

Dole reveals it will ask stockholders to pave way for the mergers by authorizing an issue of $10,000,000 worth of the new preferred. This would finance the present merger and leave over $7,000,000 for future deals.

Plans Fish Studies for '56

Budget for expanded fishing research and market development will be $3,000,000 in 1956, the full limit allowed under the Saltonstall-Kennedy Act, announces Douglas McKay, Secretary of the Interior.

New projects on which money will be spent include studies of artificial tuna baits ($35,000), research on Alaska Salmon ($108,000), an Atlantic striped bass study ($32,000), expansion of South Atlantic shrimp beds ($60,000), quality improvement of skipjack tuna catches ($10,000), better methods for handling fresh fish ($25,000).

Various biological studies and other technical research will take an additional $1,400,000 during the coming year, added Secretary McKay.

Targets Non-Food Uses As Sugar-Study Goal

"Expanded research can change sugar surpluses to shortages—but more funds are needed to reach this goal", declares Dr. H. B. Hass, president, Sugar Research Foundation.

True, newly-developed sugar detergents have already become something of a chemical sensation, he continues. And plans are now underway for their manufacture after completion of only a single pilot batch.

Further, recent studies show that sugar can be widely used in other non-food products such as plastics, paints, insecticides, and synthetic fibers. It is usually cheaper than the ingredient it replaces and frequently adds new and more desirable properties to the final product.

However, the main surface of this huge potential market has been barely scratched, Dr. Hass concludes, and the question remains, "How soon can we gain our share of it?"

World Food Shorts

Large-scale tuna canning is planned by Van Camp Sea Food, Inc., in a three-building plant at Catano, Puerto Rico. Meanwhile, further evidence of commercial quantities of tuna in the Gulf of Mexico, as reported by U. S. Fish & Wildlife Service, may shorten the present haul to Puerto Rico (most fish now being taken around the Galapagos and in other Pacific waters).

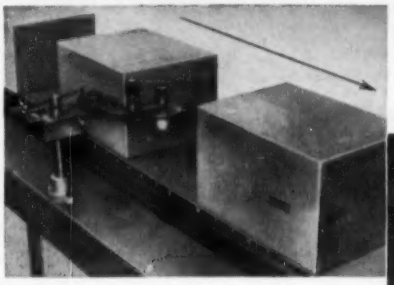
New dietetic flour developed at the American University of Beirut in Lebanon has about 54% protein, 30% carbohydrate. Texture of bread made from it is reported comparable to that of a regular white loaf, while color is slightly lighter than American-style rye bread. Patents have been leased to International Hygienic Food Co., Beirut.

Storage life of shell eggs may be increased by a new process that includes pasteurization at 63 C. for 120-180 sec. Research was conducted at the Institute of Medical & Veterinary Science, Adelaide, South Australia.

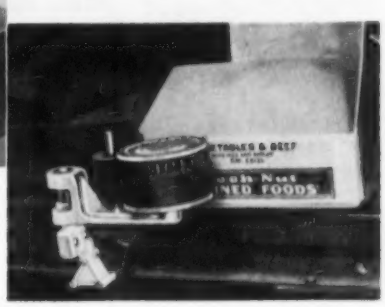
Quaker Oats Co. has new 5-acre factory at Cali, Colombia, for daily production of 30,000 cans of oats, containers being supplied by company-owned facility. Other food items will soon supplement the line.

Turkey's food industry now ranks second to textile processing in number of establishments. Thirty plants were added in '54 and 20 are slated for the near future.—*McGraw-Hill World News.*

Low-cost marking attachment pays for itself in weeks... saves thousands of $ every year



◀ ROLACODER twin-action markers ...for imprinting codes and lot numbers on 2 or 4 sides of cases simultaneously ...without requiring cases to be turned.



Friction-driven ROLACODER markers do your marking automatically... save cost of manual stencilling or stamping. Designed for easy do-it-yourself installation on existing conveyor lines, case-sealers, etc. They use quick-change rubber type or dies, hold 8-hour ink supply.

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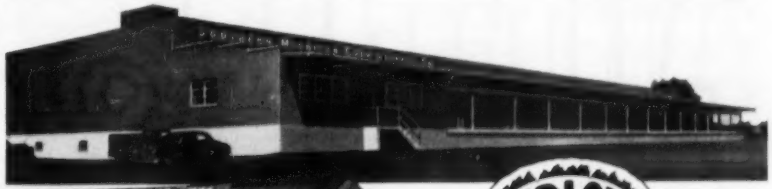

Frick square-finned coils cool the 18-million-pound freezer storage.

FRICK Refrigeration

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The frozen-food storage is cooled with 6,440 feet of the new Frick square-finned ceiling coils. Installation by Hayes Brothers, Inc., Frick Distributors at Indianapolis and South Bend.

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TEMPERATURE INDICATORS AND RECORDERS

Briefly . . .

• FROZEN FOOD CABINET survey is being made by students in frozen food courses at Long Island Agricultural & Technical Institute. Report will aid National Assn. of Frozen Food Packers in breaking the retailing bottleneck.

• **IF BEEF DEMAND of our increasing population continues at the present high per-capita level, more than 750,000 additional cattle will be required every succeeding year, according to Dr. Herrell DeGraff, Cornell U. food economist.**

• "FISH CONSUMPTION will increase 15% during the coming five years", says Harry A. Trimm, Jr., Birds Eye Div., General Foods. "And it's because processors are giving housewives a high-quality product easy to prepare and serve."

• **OPTION to take over ownership of the Welch Grape Juice Co. plants is expected to be exercised soon by the National Grape Cooperative Assn., Inc. Transaction will take place, says G. W. Lamb, NGCA treasurer, when the $15,000,000 purchase fund is completed in '56.**

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Grade Standards, Standards of Identity, quality and fill of container, and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register.*

Pumpkins, canned, and *canned squash,* AMS proposed revision of U.S. Standards, Sept. 21, F. R., p. 7081.

Grapefruit, Texas and states other than Florida, California and Arizona, AMS proposed revision of U. S. Standards. Sept. 22, F. R., p. 7077; Final promulgation, Oct. 18, F. R., p. 7803.

Apples, dried, AMS-Revised Standards, Sept. 22, F. R., p. 7095; *Miscellaneous corrections,* Oct. 8, F. R., p. 7524.

Oranges, Florida, and *tangelos,* AMS-revised U. S. Grade Standards, Sept. 28, F. R., p. 7205.

Tangerine juice for manufacturing, revision by AMS of U. S. Standards, Sept. 30, F. R. p. 7281.

Figs, dried, proposed revision by AMS of U. S. Grade Standards, Oct. 4, F. R. p. 7373.

Milk, evaporated, sweetened condensed milk, and *pasteurization of milk or cream,* revision of Definitions by FDA for use with Federal Import Milk Act, Oct. 4, F. R. p. 7364.

Plums, frozen, AMS revision of U. S. Standards, Oct. 7, F. R. p. 7490.

Insecticide tolerances on commodities: *On wheat, barley, rye, rice and corn,* calcium cynide, proposed estab-

lishment by FDA, Sept. 15, F.R. p. 6797.

On cottonseed, pineapple and sugar cane, 3-(3, 4-dichlorophenyl)-1, 1-dimethylurea, final establishment, Sept. 21, F. R. p. 7075;

On asparagus, carrots and tops, cauliflower, celery, corn, cottonseed, lettuce, lima beans, Irish potatoes, parsnips, strawberries, sugar beets and tops, sweet potatoes, turnips, and rutabagas, ethylene dibromide, proposed establishment, Sept. 29, F. R. p. 7269;

On corn, wheat, buckwheat, oats, barley, rye flaxseed, rice, popcorn, peanuts, beans and peas, piperonyl butoxide and residues of pyrethrins, proposed establishments, Sept. 29, F. R. p. 7268;

On apples, blueberries, cantalopes, celery, cucumbers, grapefruit, grapes, green beans, lemons, muskmelons, oranges, peaches, pears, plums, raspberries, sweet corn kernels, tomatoes and watermelons, Aramite, final establishment, Sept. 30, F. R. p. 7301;

On asparagus, cottonseed, dry bulb onions, pineapples, spinach, and sugarcane, 3-(p-chlorophenyl)-1, 1-dimethylurea, final establishment, Sept. 30, F. R. p. 7301;

On apples, cantalopes, lemons, oranges and pears, chlorobenzilate, final establishment, Oct. 5, F. R. p. 7393;

On apples, beans, carrots, celery, cranberries, cucumbers, eggplant, figs, grapes, melons, onions, peaches, peppers, spinach, summer and winter squash, tomatoes, almonds, and potatoes, Maneb, final establishment, Oct. 20, F. R. p. 7093.

Glucose syrup and syrup solids, FDA proposal to allow use in place of corn syrup and syrup solids in sweet chocolate, milk chocolate, skim milk chocolate, buttermilk chocolate, mixed dairy product chocolates, sweet chocolate and vegetable fat coating, sweet cacao and vegetable fat coating, pasteurized process cheese spread, pasteurized cheese spread, pasteurized process cheese spreads with fruits, vegetables or meats, pasteurized cheese spread with fruits, vegetables or meats, pasteurized Neufchatel cheese spread with other foods, cold-pack cheese food, cold-pack cheese food with fruits, vegetables or meats, canned peaches, canned peaches with rum, canned apricots, canned apricots with rum, canned pears, canned pears with rum, canned cherries, canned cherries with rum, canned fruit cocktail, fruit butter, fruit jelly, preserves, and catsup, Aug. 17 F.R., p. 5976.

Schedule of Events

November

11–15—American Meat Institute, annual convention; Palmer House, Chicago.
12–20—Food Show; National Guard Armory, Wash., D. C.
14–17—International Automation Exposition; Navy Pier, Chicago.
14–17—American Bottlers of Carbonated Beverages, exposition & convention; Dinner Key Exposition Hall, Miami, Fla.
14–18—American Society of Mechanical Engineers, power show; Coliseum, Chicago.
15–16—Dairy Industries Society, International, annual meeting; Shoreham Hotel, Wash., D. C.
15–16—American Corn Millers Federation; Sheraton Hotel, Chicago.
16–18—Assn. of Food Industry Sanitarians, annual meeting & conference; Hotel El Rancho, Sacramento, Calif.
16–18—Grocery Manufacturers of America, annual meeting; Waldorf-Astoria Hotel, New York City.
17–18—American Society for Quality Control, mid-west conference; Schroeder Hotel, Milwaukee.
28–D1—Air Conditioning & Refrigeration Institute, convention & exposition; Atlantic City Auditorium.

December

1–2—Tri-State Packers Assn., annual convention; Benjamin Franklin Hotel, Philadelphia.
1–3—American Society of Refrigerating Engineers, annual meeting; Traymore Hotel, Atlantic City.
5–9—Exposition of Chemical Industries; Commercial Museum & Convention Hall, Philadelphia.
11–13—Materials Handling Institute; Statler Hotel, New York City.

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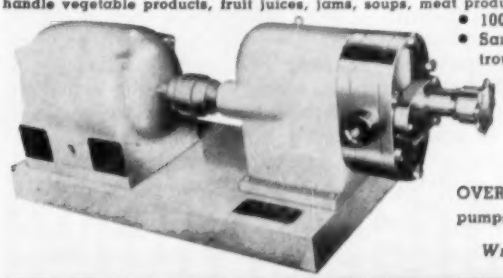

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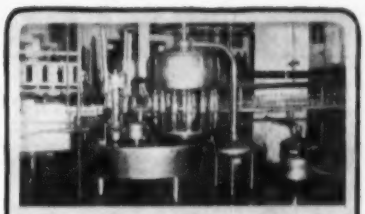

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Letters to the Editor

Sees Need for New Concepts In Training Technical Food Men

TO THE EDITOR
OF FOOD ENGINEERING

Dear Sir:

There has, in recent months, been evidence of increased interest on the part of the food industry in the formal training of food technologists. This interest is apparently motivated by the ever-growing need for more industrial personnel. It is reflected in the suggestion that the colleges currently are not training technologists in sufficient numbers, or with adequate specialization.

This last view is not shared by many in the academic phase of our profession. These educators watch, with considerable distress, the increasing emphasis being placed on greater specialization, particularly in the undergraduate curriculum.

The feeling is that, in many instances, over-specialization in food technological education has already occurred. And if this trend continues, the food industry of tomorrow will find itself populated by trained gadgeteers, and will be faced by a scarcity of well-rounded scientists!

Limits of Four-Year Course

It must be recognized by industry that the ordinary four-year collegiate course represents a rigid framework within which only a limited number of class hours may be fitted. Each time an additional course in the major field is introduced, an equivalent credit course, usually in one of the supporting sciences, must be withdrawn.

Can a food technologist really be considered well-trained if he has never, during his collegiate life, been exposed to physics, physical chemistry, biology, determinative bacteriology, or mathematics? Yet how many institutions offering bachelor degrees in food technology simply cannot fit such courses into their required curricula!

The loser is this individual graduate—who finds himself, due to his educational limitations, pegged for one class of jobs and no others.

Now the underlying principles of food technology are, without exception, the fundamental principles of the individual sciences which food technology utilizes. How, then, can we honestly expect to train scientists capable of original and creative thought if we do not give them an opportunity to acquire an understanding of, and an appreciation for, these basic scientific principles?

Equally as important as the factual knowledge acquired by the training in the basic sciences is the experience in solving problems which these courses impart.

Solving Industry Problems

Obviously, the major purpose of a company in hiring a food technologist is to have on hand an individual capable of solving problems in development, production, quality control, or any other aspect of food manufacture. A food technologist would not be of much value in his job unless he were able to solve such problems. The best training for the acquisition of the analytical skill required in the solution of technical problems is unquestionably gained in the basic science courses.

Unfortunately, by their very nature, applied courses in any field offer a considerable amount of pre-digested information and established methods. Thus the student does not get a chance to develop his ability to solve problems, except in the very narrow area of knowledge encompassed by the particular course.

Sees Faulty Concept

One of the greatest fallacies on the part of the advocates for increased specialization is their belief that the ideally trained food technologist is at once a scientist and an engineer. Is it the purpose of the perfect food technological curriculum to train an individual to be equally well-versed and proficient in the agricultural, chemical, bacteriological, nutritional and engineering skills required by the food industry? If so, it becomes immediately obvious that no four-year curriculum can possibly contain all of the training necessary to achieve this goal.

Since no one has as yet suggested increasing the course to more than four years, it is apparent that the contemplated solution lies in the further reduction of courses in the so-called pure sciences! Might it not better be realized, then, that it may be quite impossible to train, in the short span of four years, food technologists with a thorough and comprehensive background in both the necessary supporting sciences and the applied engineering skills? It certainly would be erroneous to think that only the training of more highly specialized individuals would answer all of the problems of the food industry's manpower needs!

In their clamor for more and more specialized technologists, food processors at times also tend to forget that the university community has an equal responsibility toward all society. The government and academic institutions—and the many independent research laboratories, too—are in constant quest for capable food scientists to fill their needs. These needs must be met if the research developments upon which new products and methods are based are to be kept flowing freely.

Need Scientists and Engineers

The answer then, if there is one, would seem to lie in a better realization by industry and educators of the need for "food scientists" as well as for "food engineers." Both would be equally well-versed in their respective basic sciences and possess a sufficient knowledge of foods to render them capable of applying their technical skills to food problems.

This merely would be taking a leaf out of the book of the chemical industry. It realistically distinguishes between its "chemist" and "chemical engineer" and assigns a well-defined role and training to each.

There is little doubt that the very term "food technologist," being admittedly subject to varied interpretation, has materially contributed to the existing confusion as regards academic training and delineation of job responsibilities.

It is to be hoped that the Committee on Education of the Institute of Food Technologists—which is currently studying the overall problem of food technological training—will be successful in proposing minimum requirements for a degree in food technology. And it also should realize the dangers of over-specialization and the value of clearly distinguishing between food science and food engineering curricula.—*Gideon E. Livingston, Assistant Professor of Food Technology, University of Massachusetts, Amherst.*

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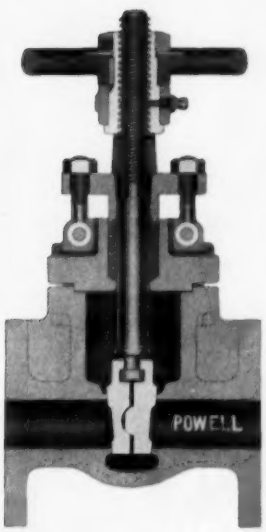

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FIG. 150—Bronze Vulcanized Composition Disc Globe Valve for 150 Pounds W. S. P.

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Time-Motion Changes

—Continued from page 63

into casepackers (Standard-Knapp, Model 805) adapted for mechanically packing of 12 or 24 retail packages into an end-fill type shipping case.

This is the procedure: Three trays are pulled from the rack by hand, and contents slid onto the de-traying table. Then, by means of a sweepbar, packages are transferred onto a 50-in.-wide wire-mesh conveyor.

Next, by means of a hydraulically actuated lift-shelf at the end of the short de-traying conveyor, 40 packages at a time are swept onto a cross conveyor on which packages are carried directly to the casepacker. Filled cases then enter 24-ft.-long top and bottom sealer.

Cases, up-ended as they emerge from the sealer, are then conveyed via a case marking conveyor, where two roller-coders (Industrial Marking Co.) automatically imprint brand name, product identification, and day-code on both ends of the case.

Finally, the one-dozen carton-shippers are conveyed under a glue applicator (Pot-Devin), where two of the end filled containers are glued together for easier handling.

The shift to the end-filled case has resulted in decided economies compared to the former use of the conventional top-filled type case.

Capacity per hour is now 6,000 one-dozen or 3,000 two-dozen (2 carloads) from three case-pack lines. A fourth line serves as a stand-by.

Gains for All

To insure full and most effective use of all equipment, all personnel connected with freezing and casepacking, work on the incentive wage plan. A bonus is paid on a sliding scale, beginning after the standard task has been met and rising as the productivity of the worker increases.

The present installation has boosted productivity approximately 300% compared to that of the previous predominantly manual methods. At the same time, labor turnover has been reduced. And the ease and dispatch with which the sizable frozen food production is handled through the freezers into the shipping cases and out into the below-zero storage warehouse has been tremendously facilitated.

The efficiency of the workers conducting the case-off operation has also increased notably during the last three years. Production output per man-hour has been considerably stepped up, and consequently the workers' earnings. In 1951, bonus payments based on the incentive plan were 165% above 1950. Per man-hour output rate showed still further increases in 1952, justifying a rise in bonus payments of 34% over 1951 earnings. Cases per line-hour have increased approximately 50%.

There are reasons for the advantages gained by the lowering of labor turnover. A number of experienced workers no longer needed on the packaging-freezing line after it had been modernized, were transferred to more desirable occupations. Meanwhile, operators remaining on the line are now in choice berths, for due to incentive, their incomes are much higher, and because of the installation of modernized equipment the fatigue element of the jobs has been greatly reduced.

Empty (knocked-down) shipping cases formerly arrived at the plant in twine-bound bundles of 25 each, and required a great deal of manual handling. Now, close collaboration with suppliers has resulted in a uniform bundling of 900 shipping cases into a 6-ft.-tall stack held together with steel strapping.

These bulk bundles are unloaded, warehoused, broken out of warehouse, and delivered to the casepacking line by forklift truck with special chisel-type forks. And the new arrangement permits one man to take care of the

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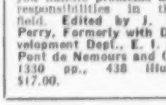

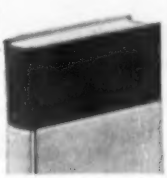

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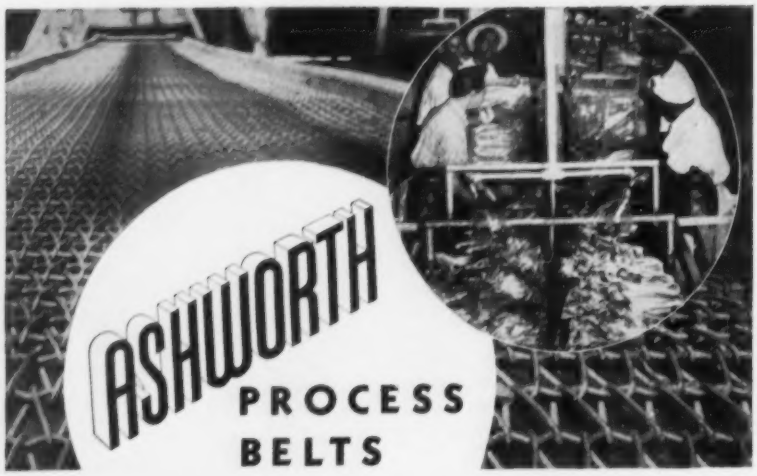

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complete shipping-case requirements of a shift, whereas previous all-manual methods required up to eight men.

When additional freezers of increased unit capacity were installed, an over-wrap machine of much higher speed was required and put into the line. This complicated the operation of filling trays with over-wrapped packages. And again time-motion studies indicated necessary changes.

Formerly, trays were placed at the end of the conveyor delivering packages from the wrapping machine. Slow rate of this operation permitted the station worker to slide ten packages into place in the tray and then shift the position of the latter for the next row of ten.

Two mechanical adjustments were called for to hand-fill trays in pace with the high-speed wrapper. First off, a second conveyor was installed and extended across the traying station. And by stepping up the velocity of this conveyor in excess of that of the conveyor from the wrapper, packages can now be lined up in front of the operator who fills the trays and, at the same time, provide a gap between the last package to arrive and the one following.

This provides space for the tray filler to grasp the last of a row of ten packages and slide the group intact over the lip of the tray and into place in it. All that was necessary to give clearance for packages over the lip was to lower the table on which the trays are filled.

Also necessary for complete efficiency were innovations in procedure, some of which were not readily foreseeable before the line modernization. Dispatching was among the systems overhauled to advantage. Now, a system of multiple coding and tagging follows each rack from the traying station to the case-coding operation.

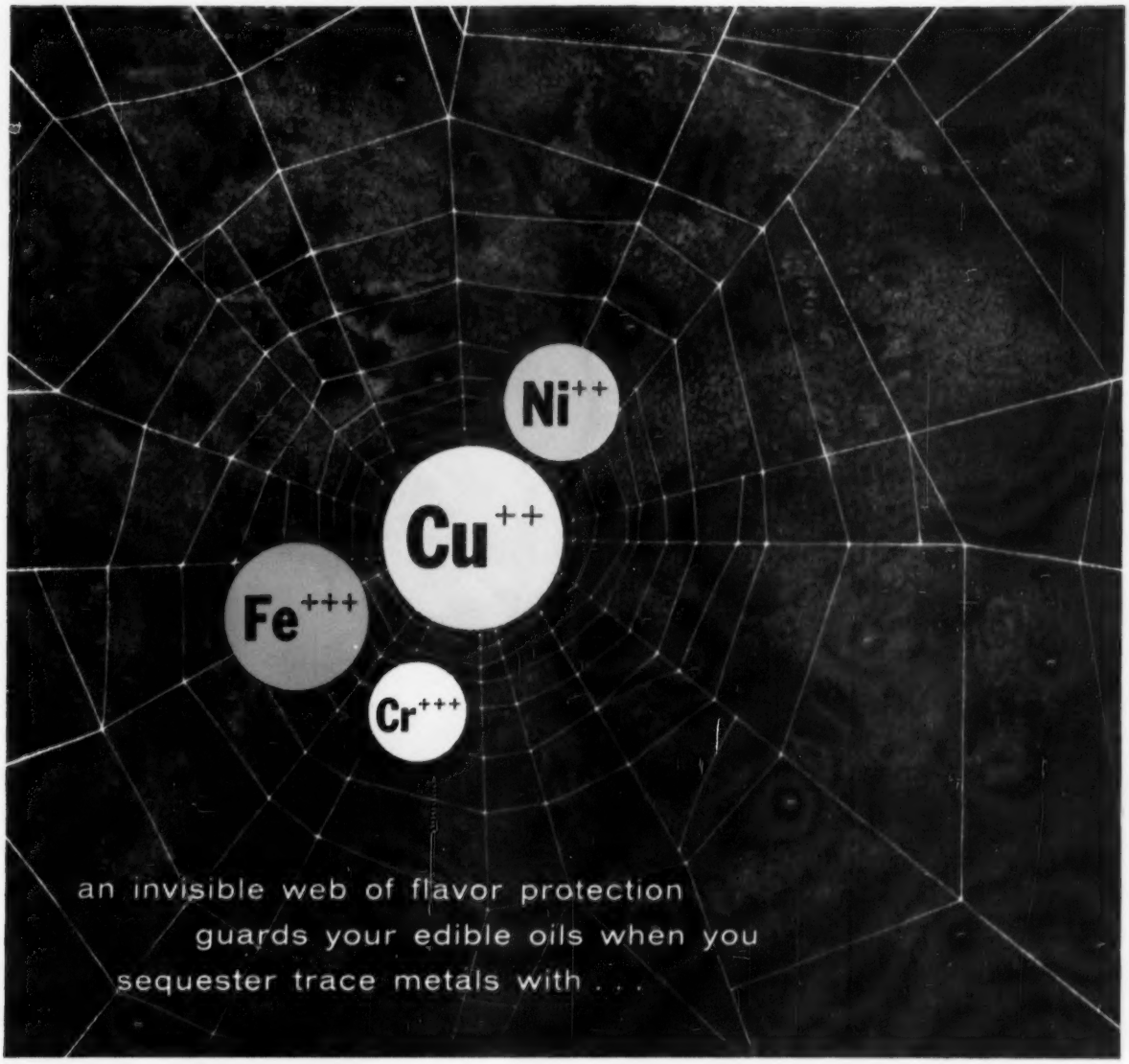
Assurance was needed (now provided by the code-tagging system) that no freezer could ever be emptied short of the required freezing-time cycle. Once installed, the new dispatch system disclosed the value of always keeping as many loaded as possible.

With the type of control now afforded, no freezer is emptied unless a loaded rack of trays is on hand for refilling that freezer.

One result of this unloading procedure is that case-off operations stop when freezer loading ends, without need of shift differential.

Thus, at the start of a day or shift no time need be lost by those on the case-off line, since all freezers are loaded with adequately frozen products to assure several hours of case filling without interruption.

End (*Resume reading on page 64*)



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Maple Syrup of Enhanced Flavor by Vacuum Concentrating at 105 F. Maple Sap to 65% Solids, Atmospheric Boiling to 90% Solids, Holding at 225-260 F.—C. O. Willits, North Hills, and W. L. Porter, Philadelphia, to U.S.A. No. 2,715,581. Aug. 16, 1955.

Air Deodorant Comprising 0.03-1% Hydroperoxide in Low-Boiling Chlorofluoromethane—L. E. Weeks, Union, Ohio, to Monsanto Chemical Co., St. Louis. No. 2,715,611. Aug. 16, 1955.

Antifoam Consisting of 5-10% Pentaerythritol Monostearate in Liquid Media—P. Gibson to Swift & Co., Chicago. No. 2,715,613. Aug. 16, 1955.

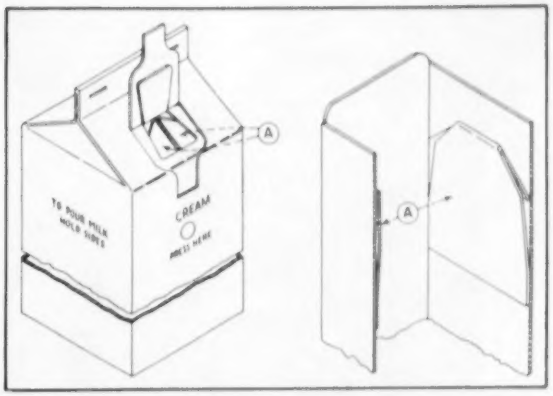
Hog Food Containing Liquid Whey Plus Ingestible Reactive Calcium Compound—P. B. Shearer, Drexel Hill, Pa. No. 2,716,063. Aug. 23, 1955.

Vitamin A Preparation Stabilized With Concentrated Citrus Fruit Peel Juice—M. K. Koffler, Tel Aviv, Israel. No. 2,716,064. Aug. 23, 1955.

Whipping Agent (pH 6.8-7.2) Comprising Alkali Metal Caseinate, Lactose, Phosphate—B. A. Patterson, Chicago. No. 2,716,606. Aug. 30, 1955.

Baby Food Consisting of Whole-Milk Solids Plus Concentrated, Pathogen-Free Mammary-Gland Phosphatase—H. A. Cranton to C. S. Miner, Chicago. No. 2,717,211. Sept. 6, 1955.

Non-Caking Detergent Having Alkali-Metal and Alkyl Benzene Sulfonate Salts, Sequestering Agent—H. S. Bloch, Chicago, and G. L. Hervet, Downers Grove, Ill., to Universal Oil Products Co., Chicago. No. 2,717,243. Sept. 6.



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Machine for Feeding and Cutting Rope of Toffee Employing Knife, Feed Rollers, Channel Section Guide, Hinged Guide Cover, Trip Member, Stopping Mechanism—R. A. Harris to Forgrove Machinery Co., Ltd., Leeds, England. No. 2,712,800. July 12, 1955.

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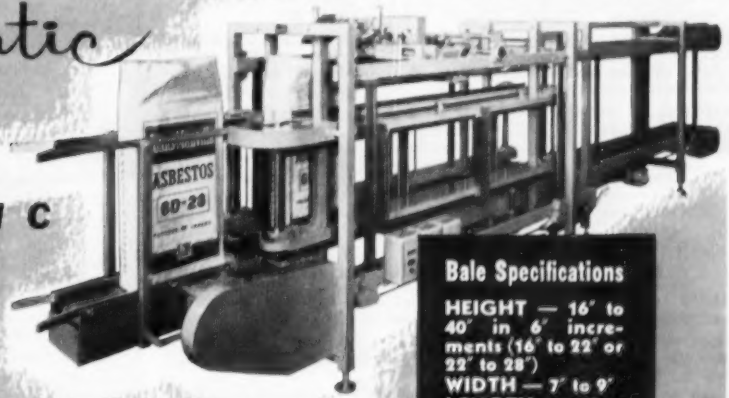

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tegral End Flaps, Longitudinal Side Flanges—B. S. Angelette, New Orleans. No. 2,714,970. Aug. 9, 1955.

Can Strip Key Consisting of Elongated Rod, Strip-Engaging Notched End, Turning Handle, Slidable Means for Ejecting Wound Coil—W. F. Lusk to W. H. and T. A. Lusk, and J. Solomon, New Castle, Pa. No. 2,715,476. Aug. 16, 1955.

Filler Comprising Rotary-Pocket Carrying Member, Material-Receiving Pocket Having Side Plates, Size-Adjusting Elements, Actuating Means—E. H. Carruthers, Warrington, Ore. No. 2,715,490. Aug. 16, 1955.

Open-Top Bags With Reversely Folded Closures Held in Contiguous Relationship by Detachable Adhesive Bonds to Facilitate Supporting, Opening During Filling—C. W. Vogt, Norwalk, Conn. No. 2,715,493. Aug. 16, 1955.

Produce Bag Filler and Scale Having Pivoted Weighing Beam, Bag-Support Means, Including Movable Foot, Links, Solenoid—F. Ahlburg and H. L. Gibson, to D. E. Ahlburg, Los Angeles. No. 2,715,511. Aug. 16, 1955.

Controlling Fill of Opaque Material in Translucent Bags With Electric Eye, Photoelectric Cell, Switch Means—H. O. Irmscher, E. Hempstead, N. Y., to National Tea Packing Co. No. 2,715,807. Aug. 23, 1955.

Heat Sealer Comprising Frame, Thermoplastic-Web Support, Elongated Heating Members, Actuating Means—W. L. Wogsland, Neenah, to R. M. Sabee, Appleton, Wis. No. 2,715,934. Aug. 23, 1955.

Unscrambler Employing Conveyor, Parallel Rollers, Spaced Collars, Drive Chain and Sprockets, Pulleys, Aligning Belts—C. A. Shuttleworth, Warren, Ind. No. 2,715,957. Aug. 23, 1955.

Package-Humidity Indicator Comprising Flanged Button Engaging Container Exterior, Recess-Mounted Card Having Chemical Spots, Transparent Cap, Air-Tight Sealing Means—W. C. Blinn, Colton, Calif. No. 2,716,338. Aug. 30, 1955.

Volumetric Filler Having Measuring Chambers Movable in Closed Path, Delivery, Check-Weighing, and Weight-Deviation Control Means—T. P. Howard, Milton, to Pneumatic Scale Corp., Quincy, Mass. No. 2,716,534. Aug. 30, 1955.

Bag Closer and Sealer Employing Intucking, Creasing Members, Adhesive Applicator, Sealing Mechanism—H. V. Kindseth to Bemis Bro. Bag Co., Minneapolis. No. 2,716,852. Sept. 6, 1955.

Collapsible Insulated Carton Consisting of One-Piece Outer Open-Top Box With Inwardly Extending Ledges, Inner Box Having Cover, Flap Portions, Interposed Blanket-Type Insulation—C. L. Parham, Jr., Dearborn, Mich. No. 2,717,114. Sept. 6, 1955.

Packing Container for Semi-Solids Comprising Nested Tubular Members, Laterally Movable Cutting Means for Separating Adjacent Units—G. A. Tomik, Doncaster, England. No. 2,717,444. Sept. 13, 1955.

PROCESSES

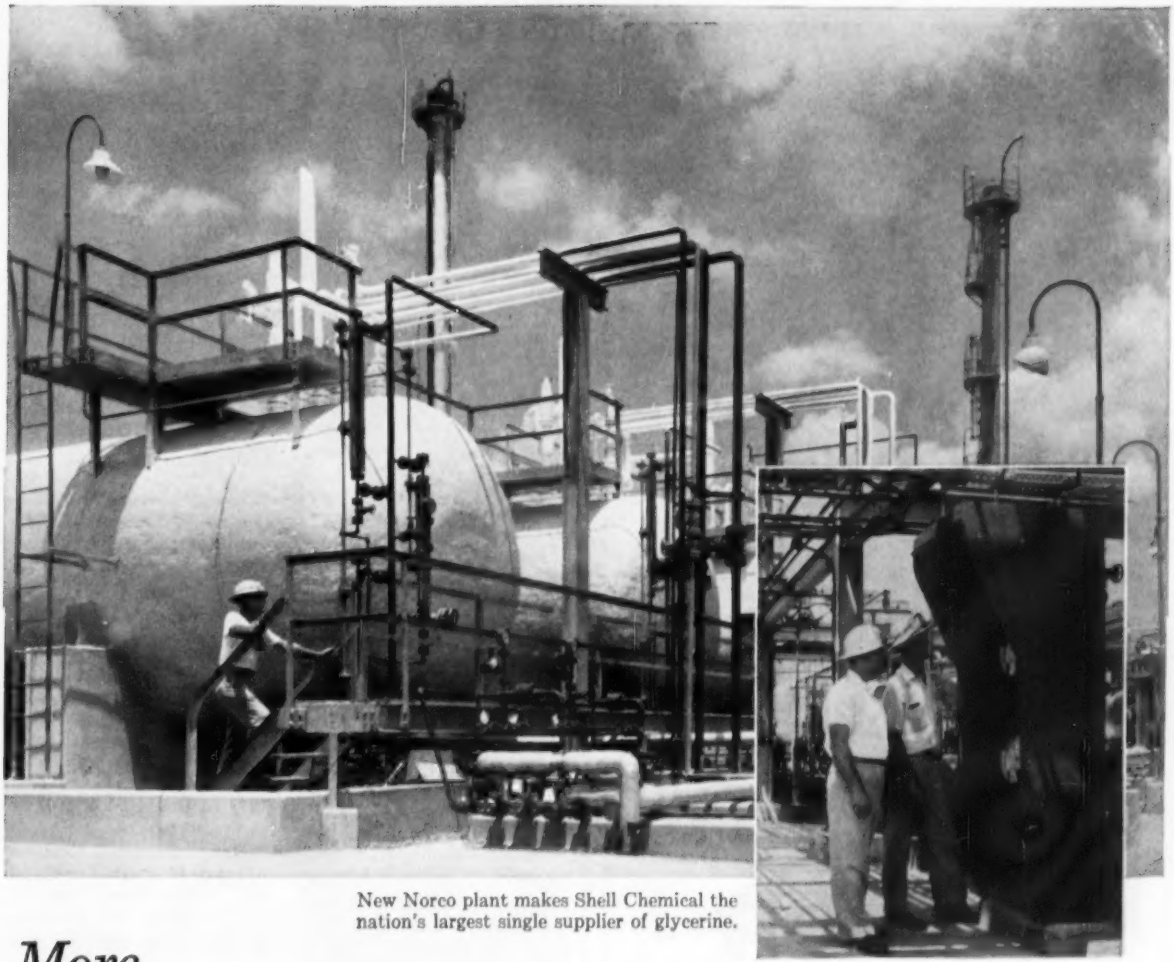
Peeling and Cleaning Shrimp by Rolling Under Pressure to Break Shell Membranes, Pinching Hull to Eject Freed Meat—R. J. Samanie, Houma, La. No. 2,712,152½. July 26, 1955.

Inhibiting Deterioration of Natural Vegetable Products by Applying Iodide, Treating With Non-Corrosive Oxidizing Gas—H. C. Marks, Glen Ridge, and F. B. Strandskov, Clifton, N. J., to Wallace & Tiernan Co. No. 2,715,582. Aug. 16, 1955.

Recovering Improved Lactase-Active, Zymase-Inactive Enzyme by Treating Lactase-Active Yeast With Ethyl Alcohol, Drying—E. R. Morgan, Bay Shore, to National Dairy Research Laboratories, Oakdale, N. Y. No. 2,715,601. Aug. 16, 1955.

Reducing Color of Fatty Acids by Hydrogenating to Saturation in Presence of Bleaching Earth, Distilling—J. W. Opie, Minneapolis, to General Mills, Inc. No. 2,715,641. Aug. 16, 1955.

Removing Ketones From Fatty Acids by Treating With an Alkylolamine, Agitating, Heating, Adding Water, Separating—G. Barsky to E. F. Drew & Co., New York City. No. 2,715,642. Aug. 16, 1955.



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Treating Freshly Slaughtered Unskinned Veal Carcasses for Mechanical Dehairing by Immersing in Bath at 130-140 F. for 5-40 Min.—K. M. Coughenour, La Grange, to Swift & Co., Chicago. No. 2,715,749. Aug. 23, 1955.

Sensing Change in Liquid's Specific Gravity by Rotating Impeller to Produce Pressure Differential Proportional to Density, Converting Output to Actuating Force—A. L. Catford, Hampton, and T. A. Dunford, Greenford, to D. Napier & Son Ltd., London, England. No. 2,715,831. Aug. 23, 1955.

Closed-Cycle Drying of Stored Material by Compressing Portion of Moisture-Laden Drying Fluid, Cooling With By-Passed Remainder, Separating Condensed Water, Expanding Compressed Fluid Into By-Pass Stream, Recycling—F. W. Lauck to A. O. Smith Corp., Milwaukee. No. 2,716,289. Aug. 30, 1955.

Cooking, Sterilizing Canned Foods by Continuously Conveying Cans Through Chamber Heated to 189-250 F. With Trichloroethylene and Perchloroethylene Vapors, Cooling —R. H. Stimpson, Pittsburgh, and J. B. Anderson, Mt. Lebanon Twsp., Pa., to H. J. Heinz Co., Pittsburgh. No. 2,716,609. Aug. 30, 1955.

Recovering Carotene Concentrates From Edible Oils by Extracting With Hydrocarbon Solvent at Below 70 C., Cooling Rapidly to 10 C., Then Slowly to —25 C., Filtering, Removing Solvent—M. C. de Witte, Zwyndrecht, Holland. No. 2,717,210. September 6, 1955.

EQUIPMENT

Slicer-Knife Sharpener Consisting of Grinding and Honing Wheels, Lever-Type Finger Means—J. D. Brown to Toledo Scale Co., Toledo, Ohio. No. 2,715,305. Aug. 16, 1955.

Ultrasonic Generator Having Rotor, Peripheral Fins, Stationary Jet Nozzle, Air-Pressure Means—C. L. Meng, Phoenix, Ariz. Nos. 2,715,383-384. Aug. 16, 1955.

Poultry Separating Device Employing Upright Frame, Receiving Unit, Friction Gear, Drive Roller, Weight-Sensitive Actuating Means—A. A. Marmet, Des Moines, Iowa. No. 2,715,387. Aug. 16, 1955.

Peanut Sheller With Abrading Cylindrical Rotor, Rectangular Grate Having Curved End and Cross-Bars Forming Discharge Spaces—B. Tillery, Phoenix City, Ala. No. 2,715,404. Aug. 16, 1955.

Sound-Absorbing Light Fixture Comprising Elongated Downwardly Concave Perforated Trough, Light Source, Fibrous Material, Suspension Means—C. W. Lemmerman, Hartford, Conn., and C. D. Smith, Los Angeles. No. 2,715,449. Aug. 16, 1955.

Beverage Brewing Crock With Removable, Transparent, Non-Corrodible Cover for Sediment Trap—I. E. Wood, New Orleans. No. 2,715,465. Aug. 16, 1955.

Ice Cream Distributing Head Including Hollow Housing, Internal Ribs, Apertured Boss, Rectangular Closure Plate With Corner Openings, Tubular Nozzle—G. G. Alexander, Savannah, Tenn. No. 2,715,484. Aug. 16, 1955.

Poultry Tendon Remover Adapted to Break Leg Bone, Pull Tendon From Drumstick —A. P. Celillo, San Francisco. No. 2,715,748. Aug. 23, 1955.

Grain Dryer Comprising Bin With Inwardly, Downwardly Converging Spaced-Apart Bottom Walls, Conveyor, Heating Unit, Screen Cage Having Vertically Adjustable Elements —E. J. Sproul, Stoughton, Wis. No. 2,715,781. Aug. 23, 1955.

Reflectance Accessory for Spectrophotometer for Evaluating Fluorescent Properties of Opaque Materials—H. J. Derr, Binghamton, N. Y. No. 2,715,851. Aug. 23, 1955.

Potato-Chip Cooker Consisting of Elongated Tank, Adjacent Heater, Fuel Burners, Oil-Carrying Tubes, Manifold, Sump, Conduit, Pump, Drains —A. Salvo, Fall River, Mass. No. 2,715,869. Aug. 23, 1955.

Machine for Cutting and Filling Confectionary Articles—W. E. Egerton, Kingston-upon-Hill, to Egerton Engineering Co., Ltd., Ilkley Hall, Ilkley, England. No. 2,715,878. Aug. 23, 1955.

Storage-Tank Breather Having Vented Housing, Semi-Cylin-

drical Valve, Relief Conduit, Inverted Cup Actuator, Pressure-Transmitting Pipe, Actuating Means—W. M. Patterson, Penn Wynne, Pa., to Sellers Injector Corp., Philadelphia. No. 2,715,909. Aug. 23, 1955.

Vegetable Slicer Employing Hopper, Pressure Closure, Slide Plate, Impaling Pins—O. Cupper and A. Doleschi, Diessen am Ammersee, Upper Bavaria, Germany. No. 2,715,927. Aug. 23, 1955.

Want more information on any of these recent patents — If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Electrical Dust Precipitator With Rotor Having Peripheral Cells, Back Plate, Conical Deflecting Shields—F. J. Dohrer, Seattle, Wash. No. 2,715,944. Aug. 23, 1955.

Granular Bed Filter Including Circular Chamber, Annular Wall Defining Influent, Effluent Channels, Sand Washer and Scraper—W. S. Martin, Massapequa, N. Y. No. 2,715,964. Aug. 23, 1955.

Pressure Filter Having Woven Wire-Mesh Screen, Perforated Backing Plate, Pressure Plate With Effluent Passages, Securing Ring—F. S. Carver, Short Hills, to Fred S. Carver, Inc., Summit, N. J. No. 2,715,965. Aug. 23, 1955.

Depanner Comprising Frame, Rotating Shaft, Fork Arms, Pivotally Mounted Tray, Actuating Means—R. N. Winfree, Lynchburg, and R. T. Watts, Roanoke, Va. No. 2,715,973. Aug. 23, 1955.

Compressor Unloader Consisting of Bypass Valve, Pressure-Responsvie Control, Check Valve—R. W. Wilson, Dayton, Ohio. No. 2,715,992. Aug. 23.

Multi-Stage Centrifuge for Countercurrent Extraction—P. Steinacker, Oelde, Westphalia, Germany. No. 2,715,994. Aug. 23, 1955.

Poultry Picker Having Opposing Frame-Mounted Drums, Flexible Projecting Fingers, Differential Drive Means—D. B. Van Volah, and I. R. Lentz, to Swift & Co., Chicago. No. 2,716,257. Aug. 30.

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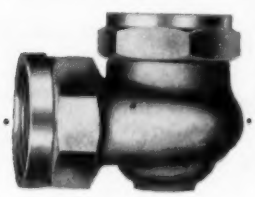

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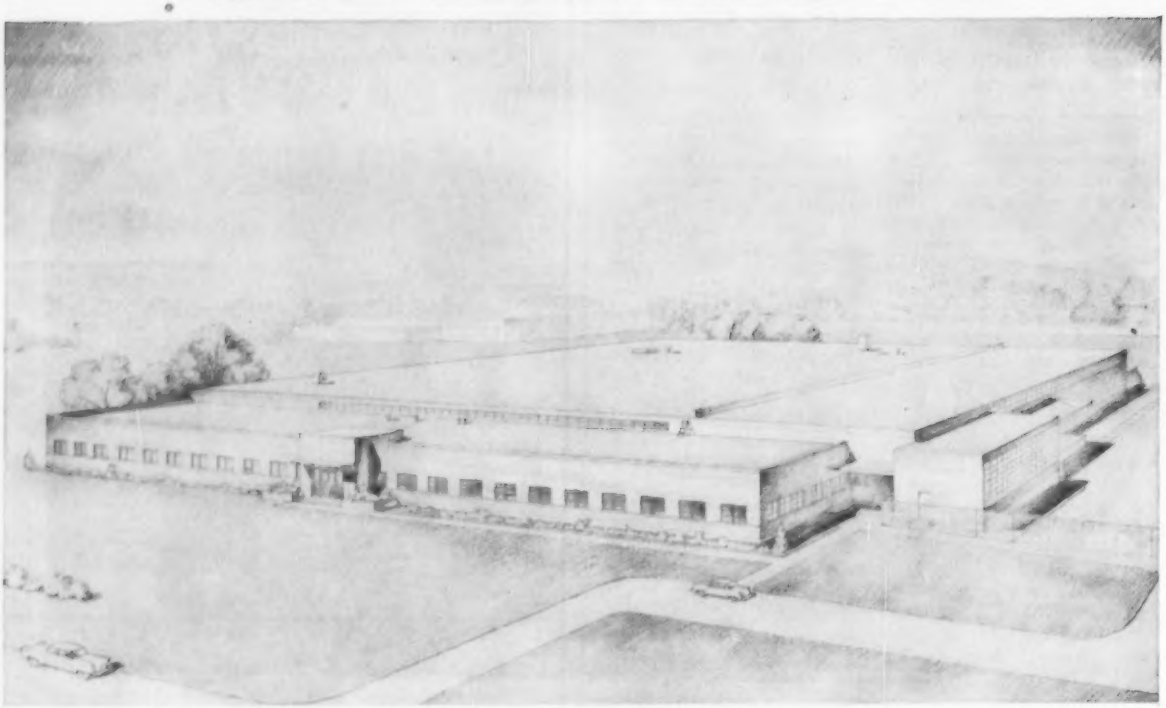

Brand-new, modern plant of Standard Packaging Corporation in Clifton, New Jersey.

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Men & Companies

Industry

American Home Foods has announced a $2 million expansion program for its Chef-Boy-Ar-Dee products facilities.

American National Foods, Inc. has taken over packing and selling of fresh fruit of **Edwards Packing Co.**, Lakeland, Fla.

Arden Farms has opened its new $500,000 ice cream plant in San Leandro, Calif.

Borden Co. has begun construction of a new biscuit plant on a three-acre tract in New Brunswick, N. J.

Bosco Co., Inc. has been acquired by **Corn Products Refining Co.**

Calif. Milling Corp. will begin construction soon of a pneumatic flour mill with capacity of 1,850 sacks per 24 hrs.

H. P. Cannon & Son, Inc. is adding a new warehouse to its Bridgeville, Del. plant, slated for completion this Jan.

Cedar Key Seafoods, subsidiary of **Milbourne Oyster Co.**, has begun operations in its new plant in Cedar City, Fla.

Centennial Flouring Mills Co., general offices in Seattle, has changed its name to **Centennial Mills, Inc.**

Cities French Bakeries, Inc. is building a $500,000 plant and office in Berkeley, Calif.

Conn. Pie Baking Co., Inc. has opened its new frozen pie plant in Wethersfield, Conn.

Consolidated Foods Corp. will open a new processing and canning plant in Texas soon.

Dole Hawaiian Pineapple Co. has signed agreements to acquire two canning firms—**F. M. Ball & Co.**, Oakland, Calif. and **Paulus Bros. Packing Co.** of Salem, Ore.

Doughnut Corp. of America has acquired controlling interest in **Chapman & Smith** of Chicago.

Fairmont Foods Co. of Parkersburg, W. Va., has purchased the assets of **Beckley Ice Cream Co.** of Beckley, W. Va.

Roy E. Morse, former research director of Wm. V. Stange Co., Chicago, has been appointed professor of food technology at Rutgers Univ. in New Brunswick, N. J.

Foremost Dairies has arranged to acquire **Fla. Dairies Co.**, Miami.

E. & J. Gallo Winery will complete its 2 million gallon addition at Modesto, Calif. in time for Calif.'s '55 harvest.

General Mills, Inc. has established its soybean operations, formerly part of the chemical division, as a separate division.

Hudson Valley Pure Foods Co., subsidiary of **Rexall Drug Co.**, has been purchased by **Seneca Grape Juice Corp.** of Dundee, N. Y.

Hunt Foods Export Corp. has purchased the food processing plant of **Leland Co., Ltd.**, at Tilbury, Canada.

Charles Kern Foods, Inc. has been established in Hato Rey, Puerto Rico to manufacture and can jams, jellies, nectars and fruit juices.

Thomas J. Lipton, Inc. has begun operations in its new $3 million tea processing and packing plant at Suffolk, Va.

Luchow Products Corp. has been formed with Jan Mitchell as president and Burt Strouse as v.-p. and general manager.

Merkel, Inc., New York City pork packer, has announced it was purchased by **Robinson-Hobbs & Co., Inc.** last June.

National Biscuit Co. will build a new biscuit and cracker bakery at Fair Lawn, N. J.

Penford Crystal Corn Syrup

Nectose Corn Syrup

Douglas Confectioners' Thin Boiling Starch

Douglas Confectioners' Moulding Starch

Douglas Confectioners' Special Moulding Starch

Douglas Pure Food Powdered Starch

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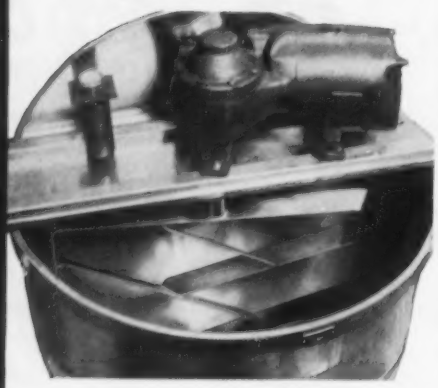
- POTATO SALAD
- BATTERS
- SALAD DRESSING
- EMULSIONS
- PIE FILLINGS
- EGG MIXES
- ICEINGS
- PRESERVES
- FROSTINGS
- SOUP MIXES
- CHEESE FOODS
- CHOW MEIN
- WHIPPED BUTTER
- CONDIMENTS



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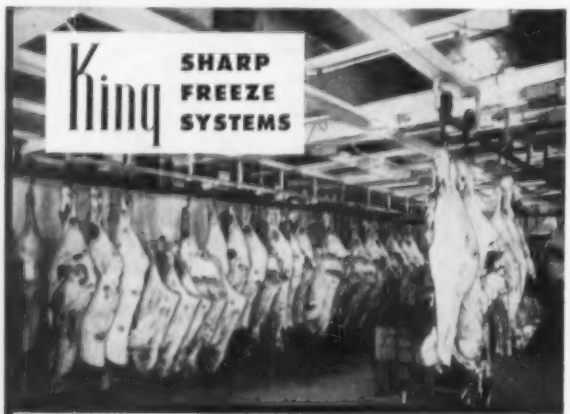

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5 King Systems permit adaptation of more simplified product handling methods.
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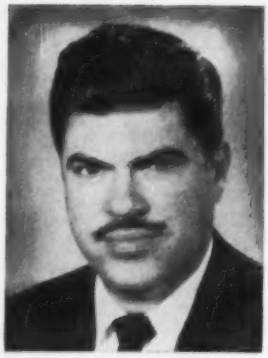

I. R. Rill, formerly v.-p. of Reddi-Wip, Inc., has been named vice-president of C & C Super Corp.

Nestle Co., White Plains, N. Y., will purchase a 70 acre tract in Na..semond County, Va. for construction of a new $2½ million plant.

Pet Milk Co. will purchase assets and business of **Crystal Canning Co.,** Frankfort, Mich.

Red Top Brewing Co. has announced a $1 million expansion program aimed at plant improvement and modernization.

Sicks' Breweries Ltd. is spending more than $1 million expanding and rebuilding its breweries in Western Canada.

Stouffer Corp. is building a frozen food processing plant in Cleveland, Ohio.

Personnel

Carol Best has been named director of home economics department of National Assn. of Frozen Food Packers.

F. W. Birkenhauer of Wagner Baking Corp. was elected vice-chairman of American Institute of Baking.

Mark Candee and **William Armstrong** have been elected to Minute Maid Corp.'s board.

James Ewell has been promoted to vice-president charge of manufacturing for Procter & Gamble Co.

John Gavin is now chief microbiologist for Food Research Lab., Inc., Long Is. City, N. Y.

James Gholson has been appointed dairy products marketing specialist at the Univ. of Minn.

Dr. D. J. Hankinson has been named head of new dairy and animal science department at Univ. of Mass.

Dr. Waldon Hastings is new associate professor on the staff of Univ. of Wash.'s flour & feed milling industries dept.

Russell Hug, v.-p. of General Baking Co., has been appointed executive vice-president.

Helen Joyce has been appointed director of newly-formed homemaker service department of Nat'l Tea Co. of Chicago.

Louis King, Jr. will head Nat'l Assn. of Bakery Sanitarians for the coming year.

J. Harold Kolseth has been named v.-p. and general sales manager of Anheuser-Busch, Inc., St. Louis, Mo.

Adolph Krieger, Jr. has been appointed controller of Pepsi-Cola Co.

R. F. McMullin has been promoted to manager of plant operations for Wilson & Co., Inc., Chicago.

Joseph Mittel and **Gustave Mallmann** have been elected directors of S & W Fine Foods, Inc.

L. R. Nafziger, president of Interstate Bakeries, has been elected chairman of American Bakers Assn., and **E. E. Kelley, Jr.,** re-elected president.

Philip Norris has been named to the board of Flour Mills of America, and **G. A. Beck** elected treasurer of the firm.

George Pillsbury, grandson of the founder, has been appointed v.-p. of Pillsbury Mills, Inc., heading the bakery and institutional div.

Dr. Arthur Prater has been elected executive v.-p. of Gentry, Inc. of Los Angeles.

Dr. Harold Raphael has been added to the packaging technology staff at Mich. State University in Lansing.

G. Douglas Reed has been made vice-president in charge of manufacturing for McCormick & Co., Baltimore tea and spice packing firm.

M. G. Rhodes of Standard Brands, is new president of the Allied Trades of the Baking Industry, Inc.

Charles Seabrook, founder of Seabrook Farms Co., has re-

ceived an honorary doctor of science degree from Rutgers University.

Dr. Austin Wagenknecht of the dept. of food science & technology at Cornell Univ., has been awarded the Gerber Post Doctorate Fellowship Award for 1955-56.

Associated Industries

Arbor Products Corp. has been formed in Nebraska City, Neb. to manufacture aluminum foil containers and packaging.

Arkell & Smiths has named J. H. Robertson treasurer and comptroller.

Bemis Bros. Bag Co. will move its subsidiary, **Flexible Package Co.**, from Chicago to Terre Haute next year.

Crown Cork & Seal Co. will construct a $1½ million research, development, and headquarters building in Towson, Md.

Crown Zellerbach Corp. will begin construction of a $2 million multiwall bag plant at Antioch, Calif. in Dec.

Ekco-Alcoa Containers, Inc. has been formed by **Alcoa** and **Ekco Products Co.**, to manufacture and sell aluminum foil containers.

Robert Gair Co., Inc. will build a shipping container plant in Cleveland.

Letson & Burpee, Vancouver, has appointed Gordon Letson president.

Liquid Carbonic Corp. has opened its $1½ million carbon dioxide plant in Oakland, Calif.

Merck & Co., Inc. has elected John Connor president.

Minn. & Ontario Paper Co. has elected Edward Johnston treasurer.

Omaha Retinning Corp. has purchased the milk and cream can div. of **Linzy Hicks Retinning Co.**, Omaha, Neb.

Package Machinery Mfrs. Inst. has re-elected Tom Miller, v.-p. of **Package Machinery Co.**, president.

Radiation Applications Inc. has appointed Dr. Joseph Silverman technical director and member of the board of directors.

Emil Schram has been elected to the board of directors of Corn Products Refining Co., New York City. Mr. Schram was president of the N. Y. Stock Exchange from 1941 to 1951 and is currently a consultant to the exchange.

Rap-in-Wax Co. has named Pierson Grieve treasurer and controller.

Refrigeration Engineering, Inc. has opened a museum designed to preserve ancient air conditioning and refrigeration equipment.

Reynolds Metals Co. has joined the **Nat'l Assn. of Frozen Food Packers** as an associate member.

Steel & Tin Products Co., Baltimore, Md., has bought five acres of land for a new plant.

Trand Plastics Co. has been formed in Norwalk, Conn. to extrude and process thermoplastic sheet.

Trane Co., La Crosse, Wis., has appointed John Cantwell, Jr. works manager.

U. S. Hoffman Machinery Corp. has acquired the Fein group of can companys which include **Atlas Can Corp.**, **Fein Tin Can Co., Inc.**, **Commercial Can Corp.**, and **Standard Can Corp.**

Deaths

Reg H. Cahill, 57, president Cahill's Pty., Ltd., Sydney, Australia,—Sept. 12.

George MacDonald, 67, retired general manager and former vice-president of Educator Biscuit Co.

Benjamin Pettengill, 76, a founder of Pettengill-Foster Co., Spencerport, N. Y.—Sept. 23.

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GLUCOSE-OXIDASE *to prevent browning due to glucose or oxygen and to increase shelf-life of food and beverage products.*	**PECTIC ENZYMES** *for the hydrolysis of pectins in fruit and fruit juices to speed processing and to make fruit juices sparkling clear for consumer appeal.*

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Clifton, New Jersey

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Some cold facts about how TIMKEN® bearings help turn out thousands of gallons of ice cream

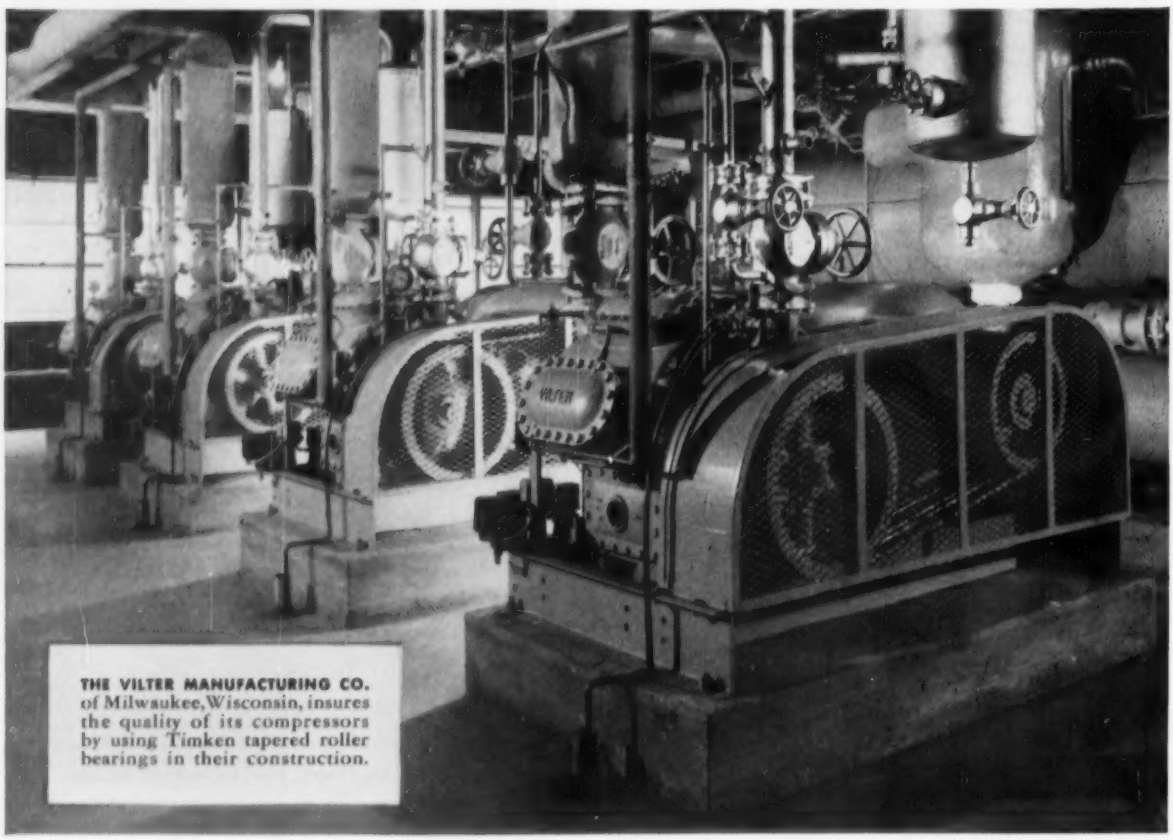
THESE Vilter compressors draw refrigerant gas from the cooling coils, compress it to a high pressure, and send it along to the condensors in a modern ice cream manufacturing plant. One reason for their continuing dependable performance is the fact that Timken® tapered roller bearings are used on the crankshafts.

Timken bearings are ideal for compressor applications because their tapered design allows them to take radial and thrust loads in any combination. What's more, they hold housings and shafts concentric, making closures more effective. Dirt and moisture stay out—lubricant stays in.

Friction is virtually eliminated when you use Timken bearings because they're designed to roll true; and made with microscopic accuracy to conform to that design. Just to make doubly sure of their quality, we produce them from nickel-rich fine alloy steel, made in our own mills. We're America's only bearing maker that takes such a precaution.

Always specify Timken bearings to make sure you get all these advantages in the equipment you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



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TAPERED ROLLER BEARINGS

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To get the best value in bearings you may find this simple formula helpful:

$$Value = \frac{quality + service + public\ acceptance}{price}$$

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Just Off the Press

New Catalogs and Bulletins
from manufacturers of equipment and supplies
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PLANT ENGINEERING

Midget Solenoid Valves

Details improvements on line of two-way midget solenoid valves. Added features include new port and pipe sizes (up to ¼ in.), new pressure ratings for normally open valves (up to 250 psi on air), and listing of valves approved for operation under explosion-tight conditions. Form V50001, 2 p.—*Automatic Switch Co., Orange, N. J. (223A)*

Hydraulic Pumps

Full information provided on engineering, design, and application of a wide line of oil-hydraulic pumps, pressure controls, volume controls, directional controls, hydraulic motors, transmissions, cylinders, and hydraulic accessories. Other components such as valves and pressure switches are covered in each category. Extensive diagrams and pictures. Catalog 5001-A, 56 p.—*Vickers Inc., Detroit. (223B)*

Motor-Bearing Design

Concerns bearing seal, housing, and automatic pressurized grease system used on company's line of ac and dc motors. Bulletin A-2406, 4 p.—*Reliance Electric & Engineering Co., Cleveland. (223C)*

Tool Steels

Informative treatise concerns manufacture of a line of tool steels. Booklet ends with conversion tables of general interest. 48 p.—*Crucible Steel Co. of America, Pittsburgh. (223D)*

Pressure Generator

Describes system for using plant air supply to develop hydraulic pressures as much as 500 times greater than actuating air pressure. Bulletin 755, 4 p.—*Milton Roy Co., Philadelphia. (223E)*

Thermocouple Accessories

Presents pictures and data for a series of standard thermocouple protecting tubes and wells. Bulletin 11-13, 4 p.—*Claude S. Gordon Co., Chicago. (223F)*

Fast Bunker Icing

Gives operating range and specifications for a rail-travelling unit said to speed freight car bunker icing. Features are said to be automatic handling of 300-lb ice cakes at speeds up to 40 per min. Unit delivers chunk, coarse, or crushed ice to roof hatches with one man control. Folder 2643, 4 p.—*Link-Belt Co, Chicago. (223G)*

Condensate Return Unit

Pictures illustrate a two-model line of condensate return pumps for heating systems operating at pressures up to 80 psi. Units available in simplex and duplex models feature a vertical turbine-type pump design. Bulletin 113-HR, 4 p.—*New York Air Brake Co., Aurora Pump Div., Aurora, Ill. (223H)*

Packaged Boilers

Concerns 13-model line of horizontal, automatic packaged steam boilers ranging in capacities from 300,000 to 4,000,000 Btu/hr. Equipment is available for gas, oil, or combination gas-oil firing and operation at pressures to 500 psi. Bulletin A-77, 4 p.—*Eclipse Fuel Engineering Co., Rockford, Ill. (223I)*

Glazed Ceramic Tiles

Full color booklet illustrates line of glazed ceramic tiles suitable for food plant construction. Charts picture and detail different forms of blocks available. Catalog 55, 28 p.—*Stark Ceramics, Inc., Canton, Ohio. (223J)*

Special-Purpose Valves

Considers a line of special gate valves for corrosive use. Units are constructed of a resistant alloy and are available with monel metal or stainless steel, stems, disks, and seat rings. Dimension table is given. Circular 592, 4 p.—*Lunkenheimer Co., Cincinnati. (223K)*

Turbo-Dryer Film

Industrial sound color film available to illustrate operation and application of turbo dryers to the food industry. Emphasis is placed on method of drying heat- or oxygen-sensitive materials.—*Wyssmont Co., Inc., Long Island City, N. Y. (223L)*

Hydramotor Valves

Comprehensive manual discusses wide line of various types of hydramotor valves, and includes engineering data and available accessories. 1955 Catalog, 54 p.—*General Controls, Glendale, Calif. (223M)*

Roof Exhauster

Leaflet shows cutaway view of power-type roof exhauster for removing fumes and circulating air. Selection chart gives details on models available from 1½ hp. to 5 hp. Bulletin F-3, 1 p.—*Proctor & Schwartz, Inc., Philadelphia. (223N)*

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Triangle Elec-Tri-Pak net weigher and filler is the most versatile machine you can buy—

Some food processors handle as many as 50 to 60 different products with a single Triangle Elec-Tri-Pak one-operator machine. Weights and packages are different, too.

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if it contains MILK it could be our *baby*

If your product contains milk solids, or is used with milk, SeaKem "Colloids Out of the Sea"® may be able to *improve body and texture, make more desirable gels, suspend component ingredients more effectively.* The stabilizing advantages of SeaKem Colloids have been clearly demonstrated in a wide variety of such products, including chocolate milk, milk base pie fillings, milk puddings, milk shake mixes, syrups and frostings.

For instance, application in milk puddings and pie fillings goes all the way from the use of a straight SeaKem Irish Moss extractive without eggs to produce a light bodied custard or blanc mange, to combinations with cornstarch, with tapioca starch, or with blends of starches. When used as a starch modifier, benefits are as follows:

1. Pudding or filling is lower in viscosity during cooking. Thus heat transfer is better and scorching over direct heat is minimized.
2. The "set" comes in part from the SeaKem Colloid. Gel forms only on cooling. Boiling temperatures, as required for starch, are not necessary to activate the Irish Moss extractive. Yet if the milk is boiled, there is no injury. Thus the housewife or baker obtains a pudding or pie filling more uniform in texture, even when overcooked or undercooked.
3. Setting time is fast, cutting length of period from preparation to serving.
4. Puddings may be unmolded easily for formal service, or for ease of serving from large batches. Pie servings are made "non-runny."
5. Common and objectionable surface skin is greatly reduced. Marked improvement in this respect is especially noticeable in chocolate flavors.
6. Unsurpassed texture and eating quality is achieved. No tendency towards pastiness and no starchy flavor. End product spoons well.

®SeaKem is the registered trademark for the standardized hydrocolloids obtained from Irish Moss by the Seaplant Chemical Corporation. Extracted and refined by rigidly controlled processes which insure dependable uniformity and purity, SeaKem Colloids are light amber to colorless, free-flowing flaky powders. Available in a variety of types suitable for a wide range of stabilizing functions, SeaKem Irish Moss extractives have won acceptance with leading food manufacturers on the basis of their unique contributions.

For more information about how SeaKem Colloids can contribute to the improvement of products containing milk solids, or which are used with milk, write Dept. FE.

Serving Industry with "Colloids Out of the Sea"

Seaplant CHEMICAL CORPORATION

63 David Street, New Bedford, Mass.

Automatic Control

Brochure pictures components and considers possibilities for use of coordinated modular electronic control units for use in data processing, design and mathematical problem solving, and industrial control. 12 p.—*Servo Corp. of America, New Hyde Park, L. I. (224A)*

Repeat-Cycle Timer

Concerns features of an electronic timer providing two, adjustable timed intervals occurring in sequence. Operation is continuous and unit is applicable wherever repeat-type operation is indicated. Bulletin 755, 1 p.—*G. C. Wilson & Co., Huntington, W. Va. (224B)*

Variable Speed Drive

Catalog pictures in detail a line of vertical and horizontal mounted, single- and double-reduction-gear variable speed motor drives. Special features available include preset, schematic, level and remote controls. 8 p.—*Sterling Electric Motors, Inc., Los Angeles. (224C)*

Wide Starter Line

Comprehensive catalog details series of general-purpose motor control devices. Starters, contactors, relays, solenoids, switches, and pilot devices are shown with prices and wiring diagrams. Information is included that compares applications of manual and magnetic control, across-the-line, and reduced voltage control. Catalog GEC-1260A, 68 p.—*General Electric Co., Schenectady, N. Y. (224D)*

Diaphragm Valves

Bulletin depicts line of diaphragm-type control valves. Units are available in double-seated, single-seated, and also three-way models. Sizes range from ½ to 8 in. Specification Sheet 429, 4 p. — *Minneapolis-Honeywell Regulator Co., Philadelphia. (224E)*

Water Filter

Gives advantages and applications of a diatomite water filter employing a porous stainless steel filter medium. Unit is said to remove even microscopic particles and is easily cleaned by simple backwashing. Available sizes are listed. Bulletin 214, 2 p.—*Micro Metallic Corp., Glen Cove, N. Y. (224F)*

Valve Line

Three bulletins cover manual and foot-operated air, water, and oil valves. Units are made for service up to 6000 psi. Flow patterns, over-all dimensions, photographs, and ordering data are given. Bulletins A-5, W-5, and O-5, total 12 p.—*Barksdale Valves, Los Angeles. (224G)*

Fitting Figures

Charts show variation in load and yield of stainless steel tubing when connected by special fittings. Test data is compiled on ¼-in., ½-in., and 1-in. stainless tubing with various wall thicknesses and pressures, and at temperatures ranging to 1800 deg. F. 4 p.—*Crawford Fitting Co., Cleveland. (224H)*

Solenoid Valve

Compact sheet gives full data, uses, and prices for a general-purpose, 2-way solenoid valve. Unit available in sizes from ⅛ to 3 in. Form Z 5004, 2 p.—*Automatic Switch Co., Orange, N. J. (224I)*

Vacuum Pump

Concerns a combination, centrifugal pump and air ejector system that is said to solve vacuum-process pumping needs by providing low maintenance cost, high handling efficiency and economical use of cooling water. Food application is listed. Bulletin P-53, 8 p.—*Whittington Pump & Engineering Corp., Indianapolis. (224J)*

MAINTENANCE

Steel Fabricating Handbook

Comprehensive tabbed handbook provides valuable information on forming, machining, cutting, joining, heat-treating and hand-finishing stainless steel. Book has many illustrations, graphs, and charts. 162 p.—*Crucible Steel Co. of America, Pittsburgh. (224K)*

Metal Coating

Brochure discusses application of sprayed-metal coating to processing equipment, tanks, storing and shipping containers, and other food handling equipment. Product is said to protect metal against foods, soap, solvents, oils and other corrosive solutions. 4 p.—*Metalweld, Inc., Philadelphia, (224L)*

Plastic Spray

Gives properties, finishes, and specifications for a liquid vinyl plastic that can be sprayed on building surfaces to form a weather-resistant sheeting. 4 p.—*Liquid Plastics Corp., Long Island City, N. Y. (224M)*

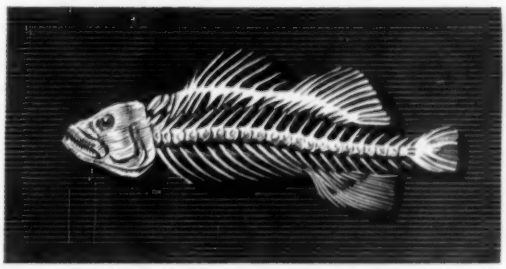
Instrument Service Tips

File sheets give up-to-date facts on maintenance and servicing of pyrometer instruments. Bulletin F7259, 11 p.—*Barber-Colman Co., Wheelco Instrument Div., Rockford, Ill. (224N)*

Rubber Products

Catalog contains data on wide line of rubber products such as:

CASE OF THE FISH AND BONE



Fundamentally, it was the sort of circumstance our engineers had become involved in many times before. But in our files it was recorded as the *241st different type of product* processed with Sutton equipment.

Specifically, the problem was to find a practical means of removing bones from dry fish fibres, the latter being a by-product in the production of high-quality shredded salt codfish. The importance of establishing an efficient solution was a matter of pure economics. With the bones removed the sale value of the by-product would automatically increase from one cent to thirty cents per pound.

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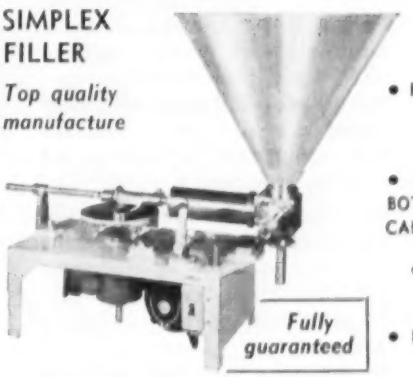

- HANDLES LIQUIDS AND SEMI-SOLIDS!
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hose, conveyor and elevator belts, transmission and V-belts, sheet packing, chute lining, and friction materials. Cutaway views show construction of different items. Form 3765-R, 8 p.—*Thermoid Co., Trenton, N. J. (224O)*

Metal-Coating Research

Special research report discloses data on penetration of protective coatings to rusty or bare metal surfaces. Graphs, charts and pictures illustrate action. 30 p.—*Rust-O-Leum Corp., Evanston, Ill. (226A)*

Magnetic Devices

Useful illustrations and installation ideas are presented for a series of magnetic plates used to remove tramp iron. Special units such as pulleys are also included. Bulletin PL-250, 4 p.—*Homer Mfg. Co., Inc., Lima, Ohio. (226B)*

Vibration Mounting

Considers uses of a series of vibration mountings used to suppress shock, noise, and vibration produced by heavy machinery. Bulletin FP-55, 4 p.—*T. R. Finn & Co., Inc., Hawthorne, N. J. (226C)*

Corrosion Control

Folder contains data that pinpoints necessity of using a protective coating to beat metal corrosion. Some industrial uses in the food field are listed.—*Amercoat Corp., Southgate, Calif. (226D)*

Lubricant Handling

Technical bulletin gives handy facts on proper storage and handling of lubricants and lubricant drums to maintain oil quality and avoid contamination. 12 p.—*Texas Co., New York City. (226E)*

MATERIALS HANDLING

Aluminum Truck

Depicts a variety of flat bed, multiple deck, and fixed-end hand trucks formed of extruded aluminum. Features lightweight operation. 4 p.—*Magnesium Co. of America, Tobey Aluminum Div., E. Chicago, Ind. (226F)*

Robot Palletizer

Provides full information on operation of an automatic palletizer, that places up to 36 cartons per min. on wood or paper pallets. Manual and automatic pattern change-overs are available on different models. 8 p.—*Food Machy. & Chemical Corp., Riverside, Calif. (226G)*

Conveyor & Elevator Manual

Comprehensive manual presents wide line of conveyor and elevator types. Detailed drawings and selection chart, with photographs of actual installation, provide additional data. Catalog 140, 62 p.—*Stephens-Adamson Mfg. Co., Aurora, Ill. (226H)*

Automatic Transmission

Cutaway view shows internal features of a fully-automatic, torque transmission installed on fork trucks with capacities from 3,000 to 8,000 lb. Gasoline, diesel, and L-P gas engines are available. 4 p.—*Yale & Towne Mfg. Co., Philadelphia. (226I)*

Lightweight Ramp

Folder shows solution to different loading problems through use of a lightweight magnesium ramp. Other portable dock boards and plates are also detailed. 4 p.—*Magnesium Co. of America, Materials Handling Div., E. Chicago, Ind. (226J)*

Fork Truck Series

Portrays a line of stand-up and sit-down fork trucks. Special attachments for unusual handling conditions are covered and units are available with automatic transmission that eliminates gear shift. 6 p.—*Lamson Mobilift Corp., Portland, Ore. (226K)*

PROCESSING

Meat Packing Equipment

General catalog covers wide line of meat packing supplies and equipment. Of particular note is a line of electric-powered saws, knocking pins, mechanical dehairers, overhead hoist and tracking systems, cutters, and smokehouses. Catalog 80, 90 p.—*Koch Supplies, Kansas City, Mo. (226L)*

Milk Fillers

Concerns a paper-carton milk filler which automatically fills, closes, and seals sizes from ½ pt. to ½ gal., at the rate of 15 cartons per min. Form 22-7-55, 2 p.—*Ex-Cell-O Corp., Detroit. (226M)*

Ice-Making Machine

Considers salient points of a chip-ice making machine that can turn out up to 50 tons of chip-ice per day. 8 p.—*Kent Ice Machine Co., Chicago, (226N)*

Claw-Type Propellers

Selection data listed for claw-type mixer propellers, said to save time and improve mixing operations.—*Crabbock Equipment Co., Inc., Wilmington, Del. (226O)*

Tubular Filters

Concerns advantages of a tube-type filtering unit for use on liquids containing a low percentage of solids. Perforated tubes are

fitted for use by rolling flat sheets of filter paper and inserting them in the tubes. Bulletin TF-160-755, 4 p.—*Industrial Filter & Pump Manufacturing Co., Chicago.* (226P)

Sanitary Fittings

Catalog lists full line of CIP and take-down sanitary fittings for stainless steel processing lines. Also, new components and machine are shown that convert take-down lines to CIP installations. Catalog 1-154, 16 p.—*Ladish Co., Triclover Div., Kenosha, Wis.* (227A)

Screening, Separating

Operation of a rotary vibration-type screening and separating unit detailed. Food industry applications listed and specifications and models discussed. Catalog 112-33. 22 p.—*Southwestern Engineering Co., Los Angeles.* (227B)

New Evaporator

Covers advantage and features of a new multi-stage jet evaporator for use on milk products. Flow-sheet shows line setup, capacities, costs, and water evaporation rate. Bulletin 323-13, 4 p.—*Mojonnier Bros Co., Chicago.* (227C)

INSTRUMENTS

Humidity Controller

Concerns advantages and operation of a compact, electric hydrometer control that can be used to automatically operate large or small humidifying and air conditioning systems. Bulletin 2273, 8 p.—*American Instrument Co., Inc., Silver Springs, Md.* (227D)

Canning Instrumentation

Technical bulletin gives facts on instrumentation systems for blanching, peeling, open-kettle cooking, gravity separation, container, pasteurization, and filling operations in the canning industry. Bulletin CAN-1, 16 p.—*Minneapolis-Honeywell Regulator Co., Philadelphia.* (227E)

Photoelectric Systems

Handy manual details wide variety of applications for photo eye controls. Many illustrations show units handling such jobs as sorting, safeguarding, adjusting, detecting, and inspecting. Component parts are catalogued. Bulletin PA 555, 20 p. — *Electronics Corp. of America, Photoswitch Div., Cambridge, Mass.* (227F)

Industrial pH Meter

Information on latest amplifying flow assembly used in industrial pH metering. Chart considers wide line of electrode components. Specification sheet 425, 4 p.—*Beckman Instruments, Inc., Fullerton, Calif.* (227G)

Boiler Plant Control

Full particulars on a line of combustion, draft, flow, liquid level, temperature, and pressure instruments for boiler plant use. Schematic drawings show model layout. Publication 55-605-83, 24 p.—*Hayes Corp., Michigan City, Ind.* (227H)

Lost Time Recorder

Pictures and describes unit that records on-off machine time on a continuous tape record. Instrument contains a totalizing counter that continuously computes up-to-the-minute operation time. 4 p.—*Standard Instruments Corp., New York City.* (227I)

Air Line Condensers, Filters

Illustrates in detail compact line of air filters for dehydration of plant compressed air supply. Units contain disposable filter cartridges. 4 p.—*Hankison Corp., Pittsburgh.* (227J)

Elapsed Timers

Concerns midget series of sealed 10,000-hr., elapsed time indicators used for keeping track of running time on electronic equipment. Unit installs in control panel. Bulletin 5, 2 p.—*Haydon Mfg. Co., Inc., Torrington, Conn.* (227K)

Dissolved Oxygen Analyzer

Brochure diagrams and describes principles, installation, and operation of a dissolved oxygen analyzer for use in steam generating plants. Unit records data continuously. Bulletin 110-A, 4 p.—*Arnold O. Beckman, Inc., S. Pasadena, Calif.* (227L)

Automatic Control System

Four bulletins show operation and features of instruments used to control temperature, electrical power-input rate, heating equipment fuel needs, and valve positioning. Bulletins F 5759-2, F 5726-1, F 6149-2, and F 5991-1. —*Barber Coleman Co., Rockford, Ill.* (227M)

Dry Materials Feeder

Leaflet illustrates positive-drive dry material feeder said to provide repeat accuracy within ± 1%. Unit contains built-in variable speed transmission and sampling gage. Accessories are listed. Bulletin 37-M1, 2 p.—*Omega Machine Co., Providence.* (227N)

Level Indicator

Specifies a rotary-paddle-type unit used to indicate and control fill in storage silos. Unit can be mounted in practically any position to suit particular conditions. 4 p.—*Bin-Dicator Co., Detroit.* (227O)

Pneumatic Flow Controller

Useful information given on the operational advantages of a pneumatic instrument for flow and pressure control in fluid lines. Unit comprises four basic sub-assemblies

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Manufacturers of . . .
. . . more than 47 types and weights of belting for transmission, elevating and conveying to serve the needs of all types of industries.

Take food, for example!
Sparks Belting has been approved by FOOD SANITATION ENGINEERS and is being used right now by the largest handlers of foodstuffs in America. It resists bacterial growth and is easy to clean. Sparks Belting is ideal for difficult jobs. It will operate trouble-free and economically, as many have discovered. If your product is hot or cold, wet or dry, raw or cooked, rough or smooth, oily, greasy, packaged or in bulk, Sparks has a belt to meet the needs of canners, bakers, confectioners, meat handlers and all food manufacturing and processing concerns.

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A new development. Cleats and body of the belt are one continuous piece, cured into an inseparable unit. No laps, gaps, cracks, crevices, bolts or rivets. Any height, width and spacing. Stiff or flexible as desired. Easy cleaning. Promotes sanitation. Colors: white, black and tan.

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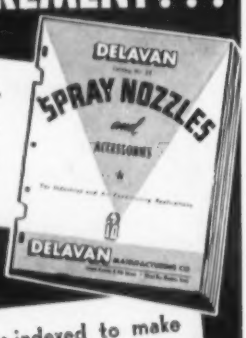

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WORCESTERSHIRE
SAUCE BASE
AND
BARBECUE
SAUCE BASE

. . . you're cookin'. . . Nothing else matches it. . . Only Florasynth's bases can stir your appetite so easily . . . and yet so economically . . . impart to your sauce an aroma and taste utterly irresistible . . .

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which are said to feature low maintenance cost and have compact simple design. Bulletin 285-M30, 6 p.—*Builders' Providence, Inc., Providence.* (227P)

Industrial Waste Treatment

Data sheet outlines development and component equipment used for control of pH and redox in industrial waste treating processes. Process Data Sheet 700 (2), 4 p.—*Leeds & Northrup Co., Philadelphia.* (229A)

Thermocouple Connectors

Concerns a series of easily detachable couplings for thermocouple circuits, consisting of mating plug and receptacle assemblies that are keyed to prevent incorrect connections. Specification sheet 56, 2 p.—*Minneapolis-Honeywell Regulator Co., Phila.* (229B)

Dual-Acting Control

Concerns operation of instrument that incorporates dual electronic control circuits. This permits independent control of a process variable at two separate points. Bulletin F-5345-1, 2 p.—*Barber-Colman Co., Rockford, Ill.* (229C)

Remote Controller

Discusses advantages for compact remote-bulb, temperature controller, said to be particularly suited to handling heavy electrical loads. Available in 60 to 550 F. temperature ranges. Brochure MC-121, 2 p.—*Fenwal, Inc., Ashland, Mass.* (229D)

QUALITY CONTROL

Moisture Determinations

Specifications and operation procedure given for a rapid direct measuring moisture balance. Enclosed unit uses infrared radiation for rapid sample drying. Sensitive torsion balance is graduated in 0.2% divisions. Bulletin 75, 4 p.—*Central Scientific Co., Chicago.* (229E)

Chemical Handbook Guide

Comprises a listing of handbooks that deal specifically with many industrial chemicals. Brief descriptions of products are given under each handbook title. 17 p.—*Diamond Alkali Co., Cleveland.* (229F)

Continuous Flow Colorimeter

Illustrates and describes principles behind a unit that automatically measures; records; and controls color, intensity and turbidity in gaseous and liquid process streams. Bulletin 383, 4 p.—*Beckman Instruments, Inc., Fullerton, Calif.* (229G)

Starch, Condiment Specimens

Booklet depicts 28 different starches and condiment specimen slides now available for microscope studies.—*R. P. Cargill Labs., Inc., New York City.* (229H)

Laboratory Heating Unit

Concerns operation and use of a variable power laboratory heater for performing distillations, evaporations, extractions, and digestions under strict heat control. Bulletin 627, 1 p.—*Precision Scientific Co., Chicago.* (229I)

Spectrographic Source

Considers advantages of a spectrographic unit that enables operator to gain optimum conditions for a wide range of analytical problems. Selector switch permits quick change-over on three circuits—high voltage condensed arc, ac arc, and dc arc. Current and voltage adjustment performed with front-panel control and read directly on meters. Bulletin 35-A, 4 p.—*Baird Associates, Inc., Cambridge.* (229J)

Cork Borer

Describes rapid hand operated machine that bores clean-cut holes through stoppers and corks. Mounts on table or wall and will handle stoppers up to 4-in. in diameter. Bulletin 600, 2 p.—*Eberbach Corp., Ann Arbor, Mich.* (229K)

Microbalance Line

Three data sheets depict speed, torsion, and standard microbalances. Technical descriptions and specifications are given along with pertinent features. Section A, Sheets 1, 2, and 10.—*C. A. Brinkmann & Co., Great Neck, L. I.* (229L)

Distilled Water Pump

Details on a bottle pump that forces distilled water from tank or carboy and permits only purified air to enter. Special filter is said to remove matter as small as 0.2 microns, thus eliminating bacteria as well as vapors, alkali, and acid gases. Bulletin 136, 1 p.—*Barnstead Still & Sterilizer Co., Boston.* (229M)

Spectrophotometers

Booklet details requirements for a variety of quantitative and quali-

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Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader-Service postcard — back of book. Then sign at the bottom and mail.

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Open-through-close door cycle is completed in 8-10 seconds automatically. Users report expensive man-truck-hours fully utilized at top efficiency — more goods handled in less time. "Open-door-time" is reduced 75%, resulting in substantial refrigeration savings.

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250 East 43rd St. New York 17, N.Y.

Research— Catalyst for Industry

tative spectrophotometer applications and recommends type of instrument for each use. Bulletin 405, 8 p.—*Beckman Instruments, Inc., Fullerton, Calif.* (229N)

Controlled Humidity Chamber

Descriptive material shows operation of compact, controlled relative humidity chamber for laboratory use. Unit is fully automatic and features high visibility, and fast, precise action. Air flow is adjustable and humidity can be controlled within ± 1%. Bulletin 5525, 4 p.—*Blue M Electric Co., Blue Island, Ill.* (230A)

Temperature Control Cabinet

Pictures uses of a dual-range storage cabinet that can be temperature-controlled at below-normal or normal incubation temperatures. Useful for bacteriological incubation and dairy product storage. Bulletin 339, 2 p.—*Precision Scientific Co., Chicago.* (230B)

PACKAGING

Tapes and Dispensers

Considers wide range of taping machines plus listing of types of tape available for each unit. Covered are manual, semi-automatic, and fully-automatic models. Basic tape applying principles are discussed. 16 p.—*Minnesota Mining & Mfg. Co., St. Paul, Minn.* (230C)

Sheet & Tubing Cutter

Describes versatile machine for cutting different-sized plastic sheets from roll stock. Will also form bags from tube stock. Said to cut costs and inventory. 4p.—*Lectromatic Devices, Inc., Chicago.* (230D)

Bag Sealer and Header

Leaflet covers operation of a unit said to receive filled bags from conveyor, tuck the gusset, and apply a header or label, then heat seal. Operation is automatic and speeds to 70 bags/min. are obtainable. Bulletin L-2, 1 p.—*Peters Mach. Co., Chicago.* (230E)

Foil Containers

Illustrates line of foil patty, pie, and cake containers. Shows automatic and semi-automatic machinery for crimping closures. Catalog D, 16 p.—*Ekco Products Co., Chicago.* (230F)

Brewery Adhesives

Full technical information on adhesives for use on beer labels, cartons, boxes, and tax stamps. Material is said to effectively resist ice water immersion. 8 p.—*H. B. Fuller Co., St. Paul, Minn.* (230G)

Strahman AUTOMATIC WATER-SAVER SPRAY NOZZLE

Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water.

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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IT PAYS TO PROTECT YOUR PAYLOAD WITH

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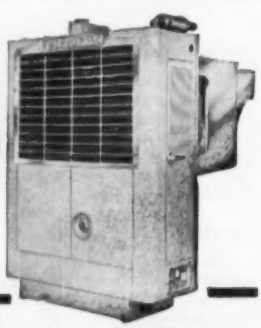

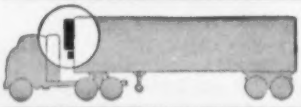

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LEADER FOR HALF A CENTURY IN THE SCIENCE OF TRANSPORTATION, FRUEHAUF CLIMAXES A PARADE OF NOTABLE PRODUCTS WITH THE . . .

Matchless New

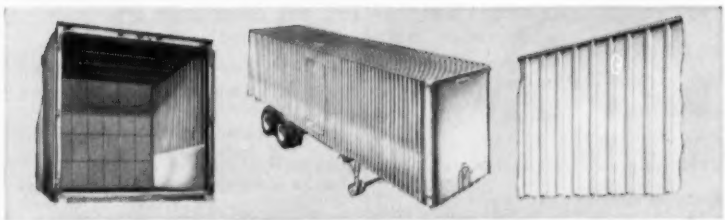
STAINLESS VOLUME★VAN!

The Extra Payload It Will Carry, For Extra Years, Is The Measure Of This Trailer's Worth To You!

FRUEHAUF NOW combines the most durable Trailer material yet discovered with the highest-capacity, *practical* Trailer design yet discovered to give you the matchless new Stainless Steel Volume★Van — highest-capacity Van in the Fruehauf line.

The *extra payload* that you ship every time a Stainless Steel Volume★Van leaves your loading dock is the real measure, in terms of dollar savings, of this Trailer's value to you. The *extra years* of service it will provide because of its stainless steel construction is a bonus investment return.

Send the coupon below for free, detailed information without obligation. *Act* now to *save* now in your business!



Highest Volume★Van Capacity

With 94" of inside width, the Stainless Volume★Van exceeds the capacity of the standard Volume★Van, which hauls up to 35% more payload than average vans in use. 91"-wide rear doors.

Many Proven Features

The corrugated roof is the same successful one used on previous stainless models. Underconstructions and other parts are interchangeable with those of other Volume★Vans for greater economy.

Time-Resistant Construction

With stainless steel for corrosion-resistance and corrugated panels for strength, this unit has the longest life-expectancy of any Trailer built! Vital welds are all reinforced. Servicing is greatly simplified.

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"ENGINEERED TRANSPORTATION"

World's Largest Builder of Truck-Trailers

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We have a house to put in order...

WE HAVE A HOUSE to put in order . . . and it's the house where America lives.

Of our country's many million homes, more than 1 out of every 10 are out-and-out slums. Nearly one-half of all American dwellings are in poor to "fair" condition, and urgently need basic repairs.

Something *must* be done—both to correct the slums of today and *prevent* the slums of tomorrow.

How do slums start? Usually just one house starts to slide downhill and soon a whole block changes. Pride is lost. Other houses are neglected, decay spreads.

So the 20 million homes in need of basic repair and improvements deserve equal attention. The time to stop the spreading blight of slums is *before it starts.*

What's your stake in stopping slums?

If you think your town is different, just look around you . . . If you think slums only affect persons who live in them, think again.

Slums raise taxes and lower property values of the whole town. They raise rates of crime, delinquency and disease. *Everyone* has a real stake in stopping slums. And *that includes you as a businessman.*

Your firm is certainly dependent on the welfare of the community where you do business. But it's more than good business—it's good citizenship to take part in efforts aimed at civic improvements. It's the *responsibility* of every business.

What can your firm do? The answer to America's housing problems starts with individuals. But to roll back slums is such a big job it's going to take more than individual effort. It will need the cooperation of your business and many others.

Some slums should be torn down and a fresh start made. Others can be remodeled and made to conform to better living standards. So it is up to you to support every sound program which seeks adequate housing for all our people.

New help is now available

There is a new national, non-profit organization called A.C.T.I.O.N.—The American Council To Improve Our Neighborhoods—which is designed to help all individuals or groups interested in putting America's house in order.

Send for a free copy of "ACTION." It explains what A.C.T.I.O.N. is and proposes to do. It lists booklets, research, check-lists, and other material which can help you. Address P. O. Box 500, Radio City Station, New York 20, N. Y.

ACTION

American **C**ouncil **T**o **I**mprove **O**ur **N**eighborhoods

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Registered Professional Engineers
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Specialists in Food Formulation, Processing, Quality Control, Testing and Evaluation; Machinery; Packaging; Freezing; Storage; Canning; Dehydration; Sanitation; Water Conditioning; Food Additives; Plant Layouts for Prepared and Pre-Packaged Foods.
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FOOD DEVELOPMENT LABORATORY
S. W. ARENSON, *Director*
Ingredient evaluations • New Products development. Specializing in flour, shortenings, milk and other basic ingredients • Facilities; chemical and physical laboratory, bakery, spray dryer and other unit process equipment.
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SCHWARZ LABORATORIES Inc.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
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WALTHAM LABORATORIES, INC.
LABORATORY SERVICES: Food analysis, extraneous matter, bacteriological tests, Water
FOOD PLANT SANITATION — INSPECTION & SAMPLING
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Write For "Food Facts"
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Project Research, Consultation, and Production Control Services in
Biochemistry, Chemistry
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Write for Price Schedule
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are live opportunities in the field of food processing and distribution.

Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.

"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.

for EVERY business WANT
"Think SEARCHLIGHT first"

INGREDIENTS for the FOOD PROCESSOR

QUALITY CONTROLLED TOASTED BREAD CRUMBS
Available—Unlimited quantity—special formulas or grinds if required. Manufactured and flash dried under most modern, sanitary conditions. Write for quotation stating quantity.
Custom made turkey stuffing mixes, prepared and spiced to your order shipped in bulk. Write for quotations stating specifications and quantities.
FS-8222, Food Engineering
330 W. 42 St., New York 36, N. Y.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 2.5 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 24-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

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The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities
Selling Opportunities Wanted
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Employment Agencies
Employment Services
Labor Bureaus

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Discount of 10% if full payment is made in advance for 4 consecutive insertions.

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Send NEW ADS to FOOD ENGINEERING, 330 W. 42nd St., N. Y. 36, N. Y. for December issue closing November 21st.

FOOD TECHNOLOGIST

Staff position in Research and Development Division of a large manufacturer with excellent surroundings in Central Ohio. Duties will include customer packaging problems and development of our own products. Substantial background in chemistry, bacteriology and foods desired. This is a permanent position with opportunity for a qualified man. All replies strictly confidential. Send details of background and experience to

P-8059, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

MECHANICAL ENGINEER
Design and Install New Projects

If you are a graduate mechanical engineer and have approximately 10 years experience in a process industry—food, chemical, oil, rubber—investigate this opening in the largest plant of one of the largest food companies in the nation. Prefer under 38 years of age. Salary around $10,000 depending upon experience. Please submit detailed resume.

P-8117, Food Engineering
330 W. 42 St., New York 36, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)
LOS ANGELES: 1111 Wilshire Blvd. (17)

POSITIONS VACANT

Engineer Draftsman capable of designing can handling equipment and making can handling system layouts. Salary commensurate with abilities. Reply with hand printed letter and representative sample of drawing ability. All replies confidential. P-7902, Food Engineering.

Production Manager. Food processing technologist and packaging specialist. P-8183, Food Engineering.

Accountant, with knowledge of reducing cost in keeping close records on production. Answer P-8184, Food Engineering.

EMPLOYMENT SERVICE

Salaried Personnel, $5,000-$30,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, P.O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Sanitation Director: Sixteen years experience health regulatory agencies, private industry. College graduate. My knowledge equipment construction, plant cleaning methods, pest control, food quality control, health laws, personnel training, will pay you dividends. Presently employed, desire change progressive organization. Excellent references. PW-7309, Food Engineering.

Plant Manager-Research-Bacteriologist. Technical direction for large dairies, candy, chocolate, cereals and baked goods plants. Knowledge of business administration, quality control, purchasing, and new products. Top in field. Available now. PW-8177, Food Engineering.

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For canning machinery sales and customer contact work. Several openings available. Applicants with mechanical or chemical engineering degree and cannery experience preferred. Please send resume of education, experience, references, salary requirement and recent photo, if available, to:

Canning Machinery Division
Food Machinery & Chemical Corporation
HOOPESTON, ILLINOIS
Attention: JOHN R. HUGHES, *Personnel Mgr.*

WE NEED

FOOD TECHNOLOGISTS and
FOOD CANNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
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HArrison 7-8600

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Of Food Engineering published monthly with 12th issue in September, at Albany, New York for October 1, 1955.

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McGRAW-HILL PUBLISHING COMPANY, INC.
By J. A. GERARDI, Vice Pres. & Treas.

Sworn to and subscribed before me this 15th day of September, 1955.
(SEAL) ELVA G. MASLIN
(My Commission expires March 30, 1956)

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to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

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WAlnut 5778
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W. HIGGENS

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SUperior 1-7000
C. J. LOUGHLIN

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17th & Sansom St.
RIttenhouse 6-0670
E. MINGLE
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AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

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FOR SALE BY OWNER

ROTARY DRIER. Countercurrent, Stainless, suitable food products. Drum: 3' by 18'. Complete accessories including: drive, steam coils, blower, cyclone, feed metering device, conveyors, feed and product hoppers. New in 1953.....**Price: $6000.**

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EIGHT PFAUDLER GLASS-LINED TANKS. Horizontal, Insulated, Sanitary construction, 3000 gal. ea. With agitators, motors and thermometers. .....**Only $250. ea.**

HAND LIFT-TRUCK for skids. Platform 32"x18"; Height 9¼2. .....**Half-price @ $125.**

VARIOUS LABORATORY EQUIPMENT @ 50 to 60% of cost. 2 Beckman pH-meters Model H-2. 2 B&L Hand Refractometers. Portable autoclave, Sterilizing Oven & Incubator. Becker Chainomatic Balance. Solubridge Conductivity Meter. 2 Muffle Furnaces. Torsion and triple-beam balances. Mesh Sieves. Bantam Demineralizer. Kjeldahls. etc.

MAPLE LEAF MILK CO.
Neenah, Wis.
Tel: PA 2-4503 & PA 2-2363

FOR SALE

Mayonnaise and Salad Dressing Machine
30 gal. "CASE" Emulsifier & Homogenizer Model S-50. Complete machine & Pump stainless S. Machine complete with tanks for mixing and holding oil, vinegar & water. Will mix, finish and pump to filler 30 gals. every 3 or 4 minutes. New condition $1,650.00

McARTHUR FOOD PRODUCTS CO.
8029 Jensen — Houston 16, Texas

For Sale
PICKLE PLANT

All machinery and equipment complete. Individual items or in lots. Building also available on lease or purchase basis if desired. Located midwest.

BO-7955, Food Engineering
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Your inquiry will have Special value . . .

If you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

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Hammer Mills
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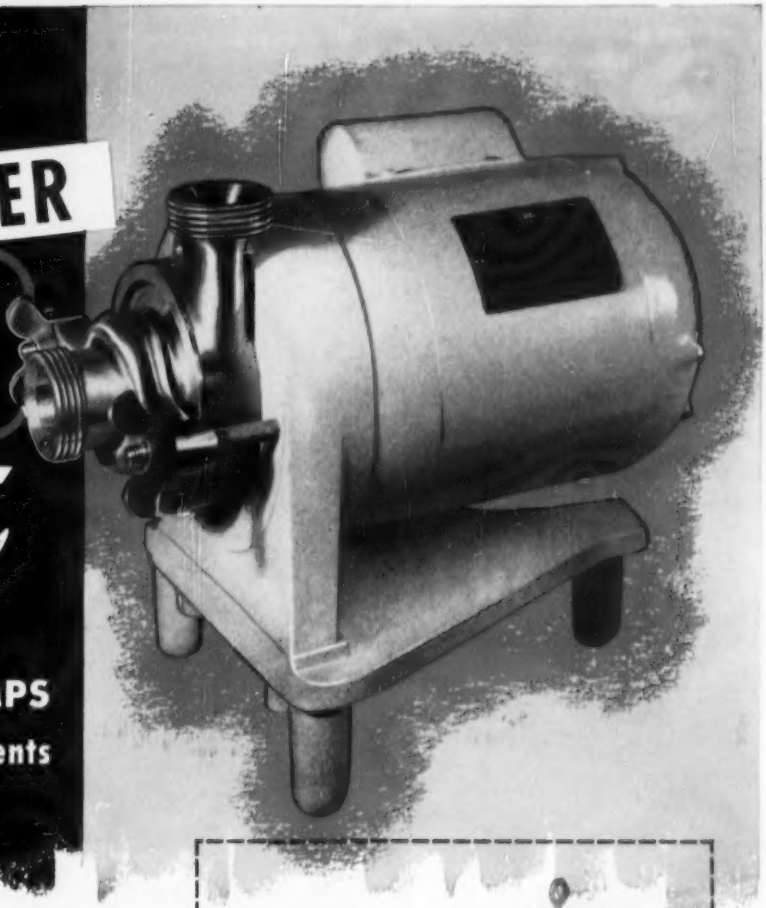

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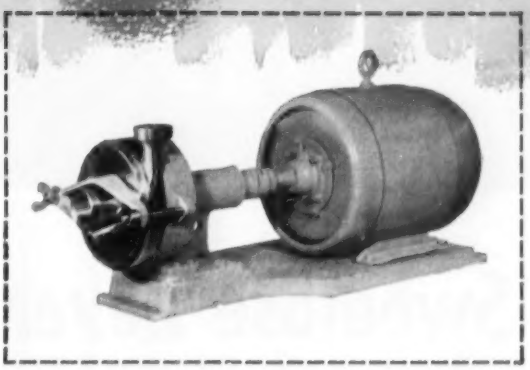

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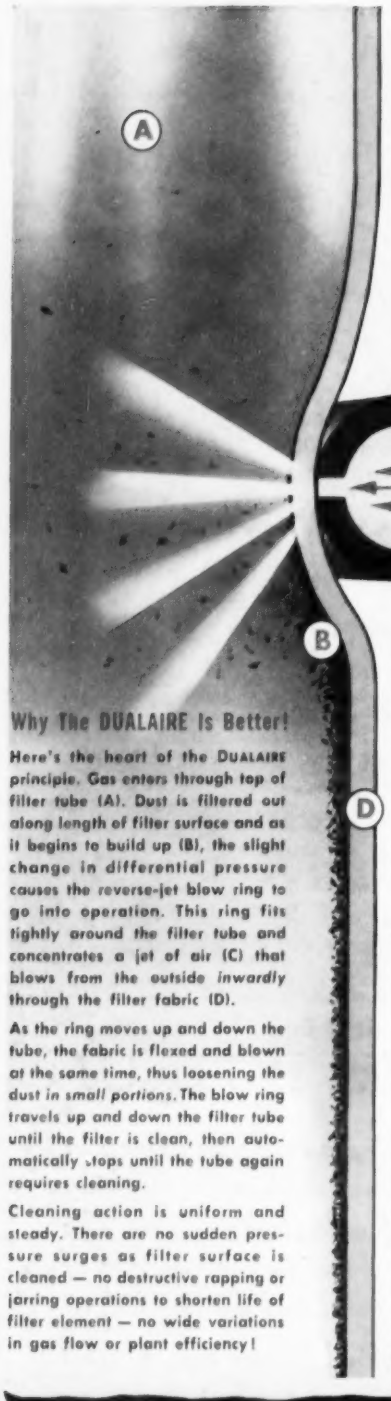

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